The Dissertation Committee for Byung-Kwan Lee Certifies that this is the approved version of the following dissertation:

The Effects of Product Knowledge on Product Memory and Evaluation in Competitive versus Non-Competitive Ad Context: within the Item-Specific and Relational Processing Framework

Committee:

Wei-Na Lee, Supervisor

Linda L. Golden

William R. Koch

John D. Leckenby

Patricia A. Stout

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Byung-Kwan Lee, BA, MA.

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Dedication

To my parents, wife, daughter, and son

for their bountiful love and support.

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I would like to thank the many people for their guidance, assistance, and support in completing this dissertation. First, I am deeply grateful to my advisor, Dr. Wei-Na Lee, for her thorough guidance and genuine support throughout this dissertation research. She has always been a great mentor and supporter for all my academic and personal matters.

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I am indebted a huge thanks to my parents and mother-in-law who have always encouraged me with immeasurable love and patience. I give my deepest thanks to my wife. She has been my best supporter and companion in my life.

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The Effects of Product Knowledge on Product Memory and Evaluation in Competitive versus Non-Competitive Ad Context: within the Item-Specific and Relational Processing Framework

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Research evidence suggests that the combined presence of item-specific (target brand information) and relational (competing brand information) encoding is necessary to induce higher memory performance and a more favorable evaluation of the target brand. This elaborative processing, however, necessarily requires cognitive capacity enough to render both types of encoding. Product knowledge is an important cognitive factor which affects how consumers understand and organize incoming product information, ultimately influencing purchase decisions. This research is proposed to investigate how consumer knowledge affects product memory, cognitive responses, evaluations, and confidence in evaluation in consideration of competitive and non-competitive ad

contexts with 11 specific research hypotheses outlined. It hypothesizes that high knowledge (HK) individuals perform well in both competitive and non-competitive ad contexts whereas LK individuals perform worse in the non-competitive than competitive ad context.

The findings suggest that product knowledge serves as a resource for elaborating on target brand information. HK individuals are able to elaborate on target brand messages regardless of whether competitive (relational) brand information is explicitly presented or not. They retrieve same amount of target attributes, elicit high elaboration thoughts (target attribute thoughts), evaluate the target brand favorably, and feel confident in evaluation in both competitive and non-competitive ad contexts. In contrast, LK individuals recall less target attributes, evaluate the target brand less favorably, and feel less confident in evaluation in the non-competitive than the competitive ad context. That is, competitive ad context (where both item-specific and relational processing are readily available) could benefit LK individuals but not HK individuals.

This study extends previous research on item-specific relational framework in consideration of competitive advertising contexts by demonstrating that LK individuals lacking in relational information can perform better in product memory and evaluation if provided with competitive brand information appropriately. This study also adds to the growing body of literature on competitive ad context by illustrating that its positive effect is not manifested in a uniform manner for all consumers and that product knowledge is a possible factor which guides its valence.

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CHAPTER I

INTRODUCTION

Consumer product knowledge is an important consumer factor which affects how consumers understand and organize incoming product information, and eventually how they evaluate brands and what brands they purchase (Alba and Hutchinson, 1987). For example, when exposed to an ad describing features of a new digital camera (e.g., resolution, shutter speed, optical zoom), consumers with a high level of knowledge (HK) about digital cameras are able to understand and integrate new product information better than low knowledge (LK) consumers due to their sophisticated and well organized knowledge structure about digital cameras.

Furthermore, because HK consumers are better aware of specific product functions than LK consumers, they will likely focus on detailed features of a digital camera in evaluations and purchase decisions. In contrast, due to their lack of specific knowledge about digital cameras, LK consumers cannot understand specific product features and, as a result, they will not be able to appreciate and retrieve product information properly. Therefore, it may be that high and low knowledge consumers elaborate differently on product information during encoding, which may ultimately produce different processing outcomes such as product memory, cognitive responses, evaluations, and confidence in product decisions.

Even though understanding processing differences between HK and LK consumers during encoding of product information is important, very little research has been aimed at understanding HK and LK consumers' elaborative processing at the time of encoding and its subsequent outcomes. Assessing the moderating role of consumer product knowledge in elaborative processing during encoding deserves much attention because elaboration on incoming product information determines organization and retrieval of the product information and the level of product knowledge affects how well integrated, retrieved, and evaluated newly acquired product information is.

As indicated above, for product information in ads to be stored in and retrieved from memory for use in later processing, the information should receive consumers' sufficient processing at the time of encoding. Research evidence suggests that the combined presence of relational and item-specific encoding is necessary to induce higher product memory and more favorable evaluation of advertising claims (Kent and Machleit, 1990; Meyers-Levy, 1991). The item-specific-relational processing framework suggests that the distinctiveness of the target brand information should be considered in relation to comparable information from other brands.

Item-specific processing is focused on elaboration on information specifically described for an object. A consumer may engage in item-specific processing by attending to details of an ad which depicts, for example, a laptop computer as having a 2.2 GHz processor, a 40 GB hard drive, and a built-in wireless mobile Internet access.

Relational processing involves emphasizing similarities or commonalities among pieces of information associated with the product category. For example, when people are exposed to an ad for a laptop computer in the context that includes ads for other laptop computers, there is likely to be an immediate elaboration of the laptop computer category as well as related category information. This might include associations of other laptop computers, features typically associated with laptop computers, inferences about occasions when it may be used, and so on. Both types of processing appear to make a distinct contribution to consumer learning in terms of ad memory and product judgments.

What is more important, only if people engage in both types of processing will they be able to understand with reasonable certitude how good a target product's favorable features are in relation to competing products in the same category. Prior research has found that both item-specific and relational processing during encoding result in better recall of product information (Kent and Machleit, 1990) and more favorable product evaluations (Malaviya, Kisielius, and Sternthal, 1996) than either item-specific or relational processing alone.

THE ROLE OF CONSUMER PRODUCT KNOWLEDGE

This elaborative processing during encoding, however, necessarily requires cognitive efforts and resources from consumers. That is, in order to get the best results in terms of product memory and evaluations, consumers will need to have cognitive capacity enough to render both item-specific and relational processing. One of the most important indicators of cognitive capacity is consumer product knowledge (Alba and Hutchinson, 1987; Brucks, 1985).

It is likely that consumers with different levels of product knowledge will engage in item-specific and relational processing in a different manner. For example, when exposed to an ad for a new digital camera along with competing brand ads in a consumer magazine, consumers with high product knowledge are able to comprehend and retrieve product information in the ads more thoroughly and figure out distinctive features of the new digital camera based on comparisons with competing brands. That is, HK consumers can process target brand information (item-specific processing) in relation to competing brand information (relational processing) in full capacity.

In contrast, lack of specific product knowledge prevents LK consumers from appreciating various product information in the ads (e.g., image resolution, optical zoom, lens focal length) properly. Since LK consumers do not possess specific, sophisticated knowledge about the digital camera, they may not be able to interpret and compare functional features among brands (i.e., how good a 5 megapixel resolution is). Thus, they will reply on more general knowledge about digital cameras. In other words, LK consumers might have a limited capacity to perform item-specific and relational processing, which may lead to inferior product memory and improper product evaluations.

The processing difference between HK and LK consumers becomes more apparent when the target brand ad is presented without competing brand ads. Suppose one noticed an ad for a new digital camera while reading a consumer magazine. She finds that the ad features specific attributes about the brand and that the ad boldly says “Compare our newest, state-of-the-art brand Super AX-70

with any brand you know." In this situation, relational processing will not be easily activated because there is no competing brand information to compare with. In this noncompetitive ad context, the most likely candidate for serving as a resource for relational processing would be the consumer's product knowledge. HK consumers are able to compare the features of the new brand with product information stored in their memory and evaluate the distinctiveness of the target brand. However, LK consumers are less able to perform relational processing because they do not have sufficient product knowledge to base for comparing and evaluating the target brand features. Thus, HK consumers will likely recall more information about the new brand and evaluate it more appropriately and confidently than LK consumers.

Current research findings cannot show the potential role of consumer knowledge moderating the effects of item-specific and relational processing on product memory, cognitive responses, evaluations, and confidence in evaluation. Admitting that consumers differ in the cognitive capacity to process incoming product information and that elaborative processing during encoding requires cognitive resources to render both types of processing, the current item-specific-relational processing framework should incorporate the role of consumer knowledge in order to predict product memory and product evaluations more precisely. Therefore, it is worthwhile to examine how consumer product knowledge moderates the effects of item-specific and relational processing on product memory, cognitive responses, product evaluations, and confidence in evaluation.

ADVERTISING CONTEXT

In exploring this issue, this research takes ad context as an important factor to consider. As indicated in the preceding discussion, consumers typically are exposed to a target brand ad either in the presence or in the absence of competing brand information. In the competitive ad context where a target brand ad is presented along with competing brand ads, both item-specific and relational processing are readily available.

However, if the target brand ad is presented without competing brand ads, only item-specific processing might be readily rendered. In the noncompetitive ad context, performing the necessary relational processing will depend on resources such as consumer product knowledge. Therefore, the moderating role of consumer knowledge in product memory and evaluations within the item-specifiϵ relational processing framework should best be manifested by examining processing differences between HK and LK consumers in the competitive and noncompetitive ad context.

RESEARCH ISSUES

Given different ad contexts, assessment of the role of product knowledge in the item-specific-relational framework will raise important research issues as follows: Will both HK and LK consumers perform well with respect to product memory and evaluations in the competitive ad context where both item-specific and relational processing are easily rendered? Will LK consumers be able to recall target brand information and evaluate it as accurate as HK consumers do? What will happen if competing brand information is not presented as in the

noncompetitive ad context? Can LK consumers evaluate the target brand without competing brand information the same way as they do when relational information is available externally? Will HK and LK consumers' cognitive responses to the target brand be different in different ad contexts? Will consumers feel confident in their evaluations both in the competitive and non-competitive ad contexts? Are LK consumers likely to feel more confident in their evaluations in the competitive ad context than in the non-competitive ad context? To answer these issues, this research attempts to investigate how consumer knowledge affects product memory, cognitive responses, evaluations, and confidence in evaluation in the competitive and noncompetitive ad context within the item-specific-relational processing framework.

ORGANIZATION OF THE DISSERTATION

This introductory chapter has suggested a need for a better understanding of and extending the item-specific-relational framework by considering the moderating role of consumer knowledge in product memory and evaluations. The following chapter reviews relevant theories and studies as a foundation for addressing this issue. Based on the literature review, testable hypotheses are proposed in Chapter III. Chapter IV outlines research methodology to test these hypotheses. This includes pretests and a main experiment. Chapter V presents the results of the empirical investigation. Finally, a discussion of the implications of the study and directions for future research are offered in chapter VI.

CHAPTER II

LITERATURE REVIEW

Before relevant theories and findings regarding encoding processes and consumer product knowledge are discussed, it might be helpful to briefly review 1) human memory in terms of how memory is organized and how it functions and 2) memory based processing in consumer research as a background for the issues of this research. In the next section, a brief discussion of the structure and processing of human memory is offered.

OVERVIEW OF HUMAN MEMORY: STRUCTURE AND PROCESSING

Over several decades in psychology, numerous different views of how memory is represented and organized have been suggested. These various viewpoints can be divided into two broad perspectives: the first considers human memory in a structural manner, that is, as having multiple, empirically dividable systems, and the second characterizes memory functionally, i.e., as one processing framework (Foster and Jelicic, 1999). Within a structural framework, some researchers have proposed that the memory system is composed of short-term and long-term memory (Atkinson and Shiffrin, 1968) while others have suggested memory structure having more than two memory stores (Baddeley, 1997). In contrast, some memory researchers have focused more on processing aspects of human memory than structural features (Craik and Lockhart, 1972).

This processing view of memory examines various operations involved when people engage in memory related tasks.

The debate between structure and processing perspectives has been around for a long period time producing efforts to best characterize human memory, which is still in progress today (see Tulving, 1999 and Roediger, Buckner, and McDermont, 1999 for recent review). Therefore, it seems appropriate to conceptualize memory reflecting both structure and processing perspectives rather than emphasizing one over the other.

Memory Structure

In general, structural memory models explain information processing in memory based on short-term and long-term memory store systems (Ratcliff and McKoon, 2002). One such model that has been particularly influential is Atkinson and Shiffrin's (1968) multi store model of memory. Within the information processing framework, Atkinson and Shiffrin (1968) postulate a multiple stores of memory emphasizing the storage functions of memory. This model proposes various permanent memory stores including sensory registers (iconic and echoic memory), short-term and long-term memory. According to the model, information reached to the sensory storage systems is delivered to the short term memory where it is stored very briefly. The information could then be conveyed to the long-term memory depending on how well it is processed while in the short-term memory.

In a competitive marketing environment, the advertiser's primary goal might be to have their brand messages stored firmly in and retrieved from

consumers' memory in purchase situations. It is long-term memory where brand information, evaluations, and usage experience are stored.

Long-Term Memory

In psychology, different typologies of long-term memory have been proposed including procedural/declarative (Squire, 1987), explicit/implicit (Schacter, 1987), episodic/semantic (Tulving, 1972) memory. Tulving's (1972) episodic and semantic memory are the most widely accepted and used in literature.

Episodic memory refers to memory for events. Retrieval of such memories involves specifying the time and place of occurrence of the events (Tulving, 1972, 1985). Examples of episodic memory include remembering the make and model of digital camera purchased at Best Buy last weekend, recalling where you had dinner yesterday and so on. Semantic memory refers to general knowledge of the world (Tulving, 1972). Information retrieved from semantic memory does not involve the original time or place of learning. Semantic memory includes not only memories of facts and concepts (e.g., what is a digital camera and what kind of brands of digital cameras are there), but higher level structures such as schemas and scripts (e.g., how to use a digital camera) as well.

When we learn new facts, they may initially be episodic in that they are linked to their context (i.e., time and place) of learning. With time, however, such memories of new facts may fall apart from the original context and thus become semantic memories as opposed to episodic memories (Roediger, Marsh, and Lee, 2002). Many researchers have conceptualized semantic memory by assuming a

network where related items (nodes) are linked and the activation of one item spreads to other associated items (Anderson and Bower, 1973; Collins and Loftus, 1975) (Spreading activation model will be discussed in greater detail later in the consumer knowledge section).

Memory Processing

Memory is thought to be involved in at least three processing stages: encoding, storage, and retrieval (Roediger and Guynn, 1996). Control processes such as rehearsal, encoding, and retrieval operate upon memory systems because only a small amount of information can be held in the short-term memory at any given time and new incoming information keeps replacing old information in the memory. Therefore, one should pay much attention to and rehearse the incoming information so that the information is transferred from short-term to permanent long-term storage (Raaijmakers and Shiffrin, 2002). The concept of control processes activated fruitful subsequent frameworks such as Craik and Lockhart's (1972) levels of processing approach. Memory processing is discussed with respect to encoding and retrieval in the following section.

Encoding

Encoding is defined as "the process of acquiring information or placing it into memory" whereas retrieval refers to "the process of recovering encoded information (Brown and Craik, 2000, p. 93)".

An alternative to the multi-store modal model is Craik and Lockhart's (1972) Levels-of-Processing (LOP) model which emphasizes the role of mental operations in memory, particularly encoding processes. The levels of processing

model assumes one memory system instead of several distinct memories, a limited processing capacity, and the ability to engage in different levels of processing (Bettman, 1979). The LOP model assumes that people are limited in their processing capacity allocated to processing information. Longer retention and better retrieval of information in memory depend on qualitatively different types of processing ranging from shallow (e.g., simple sensory analysis) to deep (e.g., more complex semantic analysis). Shallow levels of processing require less amount of processing capacity than deeper levels. It is the level of processing activated during encoding that determines the quality of retention and retrieval of information. That is, deeper levels of analysis result in better retention and retrieval.

Although LOP as a theoretical model proved to be able to account for many memory phenomena, it has been criticized to have several major problems (Neath, 1998). These include: 1) circularity in defining depth of processing (i.e., the model assumes that deeper levels of processing lead to better memory, but when there is better memory, it is attributed to a deeper level of processing), 2) vague index of depth, and 3) model's exclusive focus on encoding rather than retrieval (Craik, 1999, 2002). In response to this, some have suggested that the degree of elaboration is more important than depth alone (Craik and Tulving, 1975; Moscovitch and Craik, 1976). Craik and Jacoby (1979) suggest that elaboration of incoming information leads to a distinctive encoding which, in turn, facilitates retrieval of the information. The researchers assert that a deeper level processing during encoding induces greater elaboration and thus more

distinctive encodings of information. Therefore, depth of processing and degree of elaboration combine to produce an encoding of distinctiveness.

Retrieval

As encoding and retention of information is important, so is retrieval of the stored information. Retrieval is critical process in memory (Roediger, 2000; Roediger et al., 2002). To illustrate this, Tulving and Pearlstone (1966) presented subjects categorized word lists and tested them under conditions of free recall or recall cued by category names. Subjects recalled more words under cued recall than under free recall, leading Tulving and Pearlstone to distinguish the information available in memory from that which is accessible. They suggest that memory tests in general estimate accessible information rather than available information.

Major processing view developed in 1970s began to focus on both encoding and retrieval processes in memory (Neath, 1998). Two general frameworks that have been proposed to explain encoding/retrieval interaction are encoding specificity principle (Tulving and Thomson, 1973) and transfer appropriate processing (Morris, Bransford, and Franks, 1977).

Tulving (1972) suggests that remembering is a combined function of memory trace (reflecting encoding variables) and memory cue (reflecting retrieval variables). That is, it is imperfect to understand memory by considering either encoding or retrieval alone. Tulving proposes the encoding specificity principle asserting that a retrieval cue is effective as long as information in the cue is incorporated in the memory trace of the target information or event at the time of

its original encoding. In a similar vein, the concept of transfer appropriate processing postulates that good product memory is a positive function of the degree of overlap between encoding and retrieval processes (Morris et al., 1977; Roediger, Weldon, and Challis, 1989).

Basically, both principles assert that product memory is best when the conditions of retrieval match the conditions of encoding. That is, retrieval cues are effective to the extent that information come from the cue matches or complements those in the memory trace (Brown and Craik, 2000).

MEMORY BASED PROCESSING IN CONSUMER RESEARCH

In consumer behavior research, memory has been considered an important factor in understanding consumer processing of product information and advertising effectiveness (Bettman, 1979; Lynch and Srull, 1982) and many studies on advertising effectiveness have focused on factors related to increasing consumers' memory for advertising (Alba, Hutchinson, and Lynch, 1991; Costley and Brucks, 1992; Shapiro and Spence, 2002). The focal point is that remembering is critical in order for product information in the ad to be used as inputs to product evaluations and purchase decisions.

There are numerous factors affecting recall of advertised information: repeated ad exposure (Craig, Sternthal, and Leavitt, 1976), ad retrieval cues (Keller, 1987, 1991b), competitive context (Burke and Srull, 1988), knowledge level (Alba, 1983; Maheswaran, 1994), processing strategy (Beattie and Mitchell, 1985), processing goal (Biehal and Chakravarti, 1983; Lichtenstein and Srull, 1985), to name a few. For instance, Beattie and Mitchell (1985) examined the role

of processing strategies (i.e., brand vs. nonbrand strategy) in ad recall. They found that brand strategy condition generated higher ad recall than non brand strategy condition. Biehal and Chakravarti (1983) assert that the amount and scope of processing of product information must rely on consumers' goals during acquisition, and should influence subsequent accessibility of the information in memory. Brand attribute information is likely to be more accessible in memory if it was initially encoded under directed learning goals, as opposed to being acquired incidental to making a choice.

These studies indicate that the use of product information in memory in subsequent decision making is related to its accessibility in memory (Alba, Marmorstein, and Chattopadhyay, 1992; Biehal and Chakravarti, 1982, 1983, 1986; Feldman and Lynch, 1988) and diagnosticity of the information (Costley and Brucks, 1992; Feldman and Lynch, 1988; Lynch, Marmorstein, and Weigold, 1988). Feldman and Lynch's (1988) framework suggests that the likelihood of using any information about product in product decisions is a function of the accessibility of the target product information in memory, the accessibility of alternative product information, and the diagnosticitiy of the target and of alternative product information.

As an important issue related to the accessibility-diagnosticity concept in memory based processing, several researchers examined the relationship between product information in memory and product evaluations. It has been suggested that the effect of product information in an advertisement on attitude is a function

of how well the information is learned and remembered by the consumer (Lichtenstein and Srull, 1985).

Researchers have proposed several theoretical accounts for the memory-attitude relationship (Thorson, 1989); some assume a positive correlation between recall and attitude indicating that attitude toward the brand is formed based on the product information recalled from messages (Beattie and Mitchell, 1985). Hastie and Park (1986) suggest that recall might be highly related to the product attitude when evaluations are made based on memory and prior evaluation of the product has never been made.

However, this assertion has received little empirical support; others assert that attitudes are formed and stored separately as the time when product information is processed (Hastie and Park, 1986; Wright, 1975) and later retrieved for product evaluations. This model is represented by Wright's (1975) affect-referral. It suggests that subjects may simply recall prior evaluations of the product instead of forming their judgments anew based on recalled attributes; still others suggest that the recall-attitude relationship depends on such factors as the processing task (Hastie and Park, 1986; Johnson and Russo 1984; Loken and Hoverstad, 1985) and processing goals (Biehal and Chakravarti 1982; Lichtenstein and Srull, 1985; Srull, 1983). For example, in evaluation tasks, attitudes are not related to the ability to recall information. In contrast, in choice tasks, information recall is related to attitudes. The use of information recall to form attitudes is more likely in a choice than in an evaluation task. Lichtenstein and Srull (1985) provide an empirical finding that subjects with a processing goal

of forming an evaluation of a product during encoding stored and accessed product evaluation independently of the original information. However, subjects who did not have this goal did not form a product evaluation at the time of information encoding.

However, some researchers proposed factors affecting the recall-attitude relationship (Chattopadhyay and Alba, 1988; Kisielius and Sternthal, 1986; Lynch, Marmorstein, and Weigold, 1988). First, the diagnosticity of recalled information in product evaluation is more critical than quantity of attributes recalled. For example, in choice tasks where both recalled attribute information and evaluations are accessible, subjects use recalled attributes in decision making because prior evaluations are not diagnostic.

Second, the importance of attribute recall is affected by the decision context. Most purchase decisions require product comparison or an assessment of situations. Chattopadhyay and Alba (1988) showed subjects an automobile ad and measured cognitive responses, free recall, and attitude. They manipulated delay (between ad exposure and response measure) and the competitive product context. They found that, for both delay and no delay conditions, recall and cognitive responses influence product judgment when recalled items are weighted with valence of cognitive responses and when comparison brands are present.

It seems that information accessibility at the time of retrieval largely depends on processes that occur during encoding (Craik and Lockhart, 1972; Hunt and Einstein, 1981; Tulving and Thompson, 1973). Elaborative processing during encoding of incoming information may be the key determinant of information

accessibility (Cowley, 2002). The basic idea embedded in many different theories of memory is that at least two different ways of encoding information exist (Hunt and Einstein, 1981; Mandler, 1980). First, people can pay attention to the item-specific aspects of a particular product during encoding. This increases the likelihood that memory for that product will include features that differentiate the product from others in memory, thus making the product distinctive. The other type of processing is relational, which serves to interrelate product or to organize them based on category membership.

In a cluttered advertising environment, the context in which a target ad is placed may influence how consumers process the ad and assess products depicted in the ad. While it is true that a consumer may evaluate brands in the presence of complete product information, it may also be true that some judgments are made based on the information the consumer is able to retrieve from memory at the time of the decision. Considering the competitive advertising context and the frequent occurrence of memory based product judgments, the type of processing during encoding deserves more attention because recent evidence suggests that the type of elaboration an ad message receives from both the context and the ad itself influences later retrieval of information and product judgments (Kent and Machleit, 1990; Malaviya et al., 1996).

TWP TYPES OF ENCODING

Basically, the former type of encoding originates from the levels of processing model (Craik and Lockhart, 1972; Craik and Tulving, 1975) and the latter comes from organizational theory (Mandler, 1967, 1972). As described

previously, the levels of processing model includes the idea that a deeper level of processing yields a more distinctive memory trace than does a shallow level of processing. The more distinctive an item, the more different it is from competing items. At the same time, however, there is a large body of literature that shows that organization helps memory. When incorporating incoming information into an organization, the similarities and relations among items become the matter of concern (Hunt and McDaniel, 1993).

Item-Specific Processing: Levels of Processing Model

This encoding view focuses on the importance of item-specific information representing each of the individual events. The original assertion of levels of processing (Craik and Lockhart, 1972) is that retention and retrieval will become better when the greater amount of semantic information is extracted from each separate event. That is, encoding of distinctive information or processing of item-specific characteristics improves memory. For example, Moscovitch and Craik (1976) asked subjects to encode words either shallowly or deeply. And either unique encoding question was provided for each word or the same encoding question was given to groups of 10 words. The study found that when the encoding questions were later given as retrieval cues, product memory for deeper levels of encoding was greater in the unique condition than in the shared cue condition.

However, researchers later emphasized the importance of degree of elaboration within processing level which could produce the discriminability of the memory trace (Craik and Tulving, 1975; Lockhart, Craik, and Tulving, 1976).

Elaboration is a process of relating incoming information from an event to what is stored in knowledge (Anderson and Reder, 1979). Elaborative processing presumably operates to enhance the distinctiveness of the memory trace, not to retrieve information common to other input events. Distinctiveness has become an important concept in describing the memory trace within the levels of processing perspective (Cermak and Craik, 1979). By relying on distinctiveness as a description of the memory representation, the levels of processing model emphasizes the encoding of item-specific information. This contrasts sharply with the relational emphasis of organizational theory.

Relational Processing: Organization Theory

In addition to item-specific processing, organization has been shown to be helpful when learning new information. Organization refers to mental structures that set up relations among items, events, and features (Mandler, 1967, 1972, 2002). According to organization theory, a set of objects or events are said to be "organized when a consistent relation among the members of the set can be specified and, specifically, when membership of the objects or events in subsets (groups, concepts, categories, chunks) is stable and identifiable (Mandler, 1967)." Bower (1970, 1972; Bower and Bryant, 1991) asserts that grouping and relating are basic cognitive processes in memory organization. Bower suggests that organizational processes are necessary in memory because people inevitably engage in relating, comparing, and contrasting items or events in learning. The determinants of successful retrieval is the extent to which information is organized during encoding. Similarly, Bradshaw and Anderson (1982), as an

alternative account for the level of processing approach to memory, argue that elaboration which establishes relations between the target information and other contents increases recall performance. It appears that recall of information is best when the information is considered in relation to other information, which indicates the importance of the structure of the material.

There are several important processing propositions in organization theories (Postman, 1972). First of all, people should perceive the presence of taxonomic, semantic, or conceptual categories in a set of items in order to impose organization in the incoming material (Mandler, 1967). Second, good retention and retrieval depend on the integration of structure made at the time of encoding (Mandler and Pearlstone, 1966; Mandler, Pearlstone, and Koopmans, 1969). For example, Bellezza, Cheesman, and Reddy (1977) had subjects make up sentences for each item from lists of unrelated words, but for half of the items, subjects were asked to create sentences as part of a story. Results found that items processed with story sentences were recalled better than other items. This indicates that organizational processing yields greater recall than semantic processing. In a similar vein, Tulving (1968) found that subjectively defined similar items tend to be recalled together.

Therefore, it seems that optimal product memory results from a memory trace including relational information shared by a number of individual events. Organization theories suggest encoding processes should develop relational information common to a set of items or events presented and the representation

of the information is likely to be highly organized around the features shared by the separate events (Tulving and Donaldson, 1972).

To summarize, one type of elaborative processing leads to the encoding of item-specific information, that is, information that emphasizes the distinctiveness of individual items whereas organizational processing leads to the encoding of relational information, that is, information that emphasizes similarities among input elements or events.

Item-Specific-Relational Processing Framework

Researchers in psychology and consumer behavior have found that people engage in two types of encoding processing which facilitates comprehension and product memory in a combined way (Einstein and Hunt, 1980; Hunt and Einstein, 1981; Meyers-Levy, 1991; Meyers-Levy and Malaviya, 1999). These are item-specific and relational processing that can be generated by target and contextual stimuli (Hunt and Einstein, 1981; Hunt and McDaniel, 1993; Hunt and Seta, 1984; Meyers-Levy, 1991; Meyers-Levy and Malaviya, 1999). Several studies in consumer behavior have also suggested that the co-occurrence of both types of elaboration enhances ad processing and product judgments more than when only one type of elaboration predominates (Malaviya et al., 1996; Meyers-Levy, 1991).

Hunt (1995) and Hunt and Lamb (2001) argue that both organizational and distinctive processes are important to memory. According to this item-specific-relational processing framework, distinctiveness of the stimulus items is not sufficient to produce better recall and recognition performance but must be considered in relation to the context (similarity or organization). That is, both

similarity and difference are necessary because both reflect particular types of processing (Hunt and McDaniel, 1993). The effects of distinctiveness processing are relative to similarity in that distinctiveness in the context of similarity facilitates performance more than does distinctiveness without similarity. Therefore, it seems that information should be encoded in terms of both item-specific features (characteristics that are unique to a particular stimulus) and relational features (characteristics shared with other information presented either concurrently or previously).

Major Findings

The distinction between relational and item-specific processing has proved its utility in a number of areas, including recall and clustering (Einstein & Hunt, 1980), typicality effects (Hunt & Einstein, 1981), prose memory (e.g., Einstein, McDaniel, Bowers, and Stevens, 1984: McDaniel, Einstein, Dunay, and Cobb, 1986), conceptual versus orthographic isolation (Hunt and Mitchell, 1982), the generation effect (Gardiner and Hampton, 1988; McDaniel and Waddill, 1990; McDaniel, Waddill, and Einstein, 1988), category size effects (Hunt and Seta, 1984), category superiority effects (Sharps, Wilson-Leff, and Price, 1995), hypermnesia (Burns, 1993; Kelley and Nairne, 2003; Klein, Loftus, Kihlstrom, and Aseron, 1989), self referent encoding (Klein and Loftus, 1988), and interference effects (Burns and Gold, 1999; Mulligan, 1999, 2000).

Memory

Several researchers have suggested that both distinctive processing (or the encoding of differences among stimuli) and organization (or the encoding of

similarities) are important for successful remembering (Ausubel, 1962; Einstein and Hunt, 1980; Hunt and Mitchell, 1982).

In a series of experiments, Einstein and Hunt (1980) and Hunt and Einstein (1981) sought to apply the results of two broad approaches to the study of human memory, which are organization and levels of processing. They hypothesized that retrieval of stimulus items is best when subjects employ both relational and item-specific processing while encoding the material. Einstein and Hunt (1980) asked subjects to perform either pleasantness rating tasks to induce item-specific processing by focusing on the meaning of individual words or sorting tasks which make subjects focus attention on relationships among words. They found that when performed upon related word lists (relational processing), the pleasantness rating task produced better recall than the sorting task. When performed upon lists of unrelated word lists (item-specific processing), the sorting task leaded to better recall. They pointed out that relational processing helps create a retrieval path by emphasizing the similarities among the items. Item-specific processing, however, permits subjects to distinguish or discriminate among the individual items during retrieval.

In Ackerman's (1986) study, subjects were shown pairs of related cue-target words and asked to remember target words in free and cued recall tasks. Targets were chosen from six taxonomic categories and the pairs were presented in a categorically blocked order or randomly. Subjects were assigned to one of three acquisition orienting conditions which ask subjects to focus on the categorical relations among the targets, item-specific information, or no questions

were asked. Results suggested that relational information was useful in free recall, while item-specific information was useful in cued recall.

Text Memory

Both types of encoding have been known to influence product memory for text materials. In their item-specifiϵ relational processing framework, researchers suggest that different types of text materials and processing activities encourage encoding of different types of information and that high recall occurs when subjects encode both relational and individual item information (Einstein, McDaniel, Bowers, and Stevens, 1984; Einstein, McDaniel, Owen, and Cote, 1990). This indicates that product memory should be maximal when a processing activity facilitates the type of information that is not sufficiently invited by the text material. For example, Einstein et al. (1984) demonstrated that recall of textual materials is an interactive function of factors influencing the encoding of both relational and item-specific information. They presented subjects with either an ambiguous passage or a highly organized passage. Orienting tasks were administered by asking subjects to pay attention either on the relationships among the sentences of the text material or on the individual sentences of the text material. The study found that subjects recalled ambiguous passages better in the relational task and structured passages better in the sentence-specific task.

In a similar vein, McDaniel, Einstein, Dunay, and Cobb (1986), in two experiments, asked subjects to read a fairy tale (presumed to invite relational processing) or a descriptive passage (individual sentence-specific processing). While reading the passage, subjects were instructed to perform one of two

processing tasks; the letter deletion task encourages individual item processing and the sorting task mainly facilitates processing of relational information. As expected by the study, the letter deletion task increased recall for the fairy tale whereas the sentence sorting task enhanced recall for the descriptive passage.

Other Memory-Related Phenomena

Category size effect. Hunt and Seta (1984), within the item-specific-relational processing framework, assumed that increasing set size for a category encourages the encoding of shared features and that small categories facilitate item-specific processing. Their expectation was that supplying item-specific information to large categories and shared information to small categories should enhance recall. Their results showed that higher recall of large categories following an item-specific orienting task and higher recall of small categories following a relational orienting task. This confirms the item-specific relational processing principle such that optimal recall involves both relational and item-specific information. Hunt, Ausley, and Schultz (1986) also found that memory for sentences is best when processing of the two types of information are combined. They demonstrated that recall of sentences was greatest for large sets following the item-specific orienting task and for small sets following the relational orienting task.

Generation effect. Items subjects elicit (e.g., through an imagery task) are better remembered than items they read. This phenomenon is called the generation effect and has received empirical supports (Gardiner and Hampton, 1985, 1988; Hirshman and Bjork, 1988). Gardiner and Hampton (1988) assert that

the self-generating task, compared to the reading task, enhances item-specific processing, thereby facilitating distinctiveness of to-be-remembered items. They found that when an orienting task such as item typicality rating task which also enhances item-specific processing followed, the generation effect disappeared.

Repeated recall tests effect (Hypermnesia). Typical memory experiments use a single test to assess subjects' memory. However, research has shown that a single test may not be sufficient to reveal what subjects remember (Otani and Louis, 1995). When a test is repeated, product memory is often enhanced. This improvement in performance under repeated testing has been called hypermnesia. Studies find that the accessibility of information changes over repeated testing in two ways: (1) items not recalled on prior tests may be recalled on later tests (item gains), and (2) items recalled on early trials may not be recalled on later tests (item losses). If item gains are greater than item losses, then hypermnesia exists.

Increasingly enough, researchers have become interested in the role of encoding processes (relational and item-specific processing) in producing hypermnesia and other repeated testing effects (e.g., Burns, 1993; Kelley and Nairne, 2003; Klein, Loftus, Kihlstrom, and Aseron, 1989; Klein, Loftus, and Schell, 1994; McDaniel, Moore, and Whiteman, 1998; Otani and Louis, 1995). McDaniel et al. (1998), for example, demonstrated that relational processing contributed to greater hypermnesia by reducing item losses across test trials and item-specific processing produced greater hypermnesia by enhancing item gains. It appears that the information made available by item-specific and organizational tasks contributes differently to repeated recall performance. In each trial,

elaborative (item-specific) tasks emphasize unique attributes of items. Thus, when items are recalled, each elaborated item is likely to create various retrieval cues. Subjects are not likely to use up all the retrieval cues in the first test of multiple recall. A following test will allow subjects an additional chance to recover these cues and, thus, produce item gains. By contrast, organizational tasks provide the basis for an organized retrieval plan for multiple recall tests. The plan, once developed, is stored in memory and used to guide recall across trials, thus increasing the likelihood that an item, once recalled, will not be lost in subsequent trials.

Major Findings in Consumer Research

As discussed above, research evidence from cognitive psychology suggests that the combined presence of relational and item-specific elaboration is necessary to render favorable evaluation of advertising claims. The item-specific processing is focused on elaboration on information specifically described for an object. A consumer may engage in item-specific processing by attending to details of a laptop ad which depicts the laptop as having a 2.2 GHz processor, a 40 GB hard drive, and built-in wireless mobile Internet access. Relational processing involves emphasizing similarities or commonalities among pieces of information associated with the categories. For example, when people are exposed to an ad for a laptop computer in the context that includes advertisements for other laptop computers, there is likely to be immediate elaboration of the laptop computer category as well as related category information. This might include associations of other laptop computers, features typically associated with laptop computers,

inferences about occasions when it may be used, and so on. Both types of processing appear to make a distinct contribution to consumer learning in terms of ad memory and product judgments. What is more important, it seems that only if people engage in a certain amount of both types of processing they might be able to understand with reasonable certitude how good a target product's favorable features are compared to other products in the same category.

For example, the fact that digital camera A has 4 mega pixel resolution is not easy to evaluate unless there is also other brands' information about resolution. That is, if we examine information specific to the target brand and compare it with information from competitor brands at the same time, we may be able to figure out how good or bad or how distinctive the target brand is and easily remember the target brand information. This is because both types of encoding (target brand specific and relational encoding) can best serve to improve memory for target product information compared to either one type of encoding. In an integrative persuasion framework, Meyers-Levy and Malaviya (1999) posit that the distinction between the two types of processing is important because each contributes differently to alternative forms of memory (recall and recognition; Meyers-Levy, 1991; Tavassoli, 1998) and to judgment or persuasion (Malaviya et al. 1996).

Memory

Several consumer researchers have demonstrated empirically that the presence of both types of elaboration at encoding yields better free recall of stimulus information than that which occurs in the presence of either relational or

item-specific processing alone (Kent and Machleit, 1990; Meyers-Levy, 1991). Relational processing is thought to facilitate free recall by encouraging the retrieval of target product information from memory in relation to other products in the same category. Item-specific processing appears to facilitate product memory by fostering access to specific information about the target brand and helps discriminate it from inaccurate information about the brand (Meyers-Levy, 1991).

In Meyers-Levy's (1991) study, subjects received an ad containing 14 attributes about an apartment complex which indicate benefits of safety, aesthetics, and convenience. The number of attributes that imply each benefit varied in such a way that two attributes imply a first benefit, four attributes imply a second benefit, and eight attributes imply the third benefit. The assumption was that the larger the attribute set size, the more likely relational processing will occur. Subjects were also given one of two task instructions; either item-specific processing or relational processing. In the item-specific processing condition, subjects were asked to make an image of the apartment when they read the ad. In contrast, for subjects in the relational processing condition, organizer cues were properly placed before each of the attributes in order to encourage categorization of each attribute into appropriate benefits. The results showed that recall performance was enhanced for the small attribute set in the organizer cue condition and for the large attribute set in the image condition. That is, ad claim recall was improved when both item-specific and relational processing were ensured.

Malaviya, Kisielius, and Sternthal (1996) presented subjects either an attribute focused target ad (i.e., presumed to evoke item-specific processing) or an image focused target ad (i.e., presumed to evoke relational processing). The target ad was embedded in either unrelated product ads context (promoting item-specific processing) or competitive product ads context (promoting relational processing). The study found that recognition of target product attributes was higher in attribute focused ad and unrelated product ads conditions than other conditions. It was also found that category related thoughts were greater in image focused ad and competitive product ads conditions.

Apparently, the combined effects of item-specific and relational processing on product memory in consumer behavior have received empirical supports. Free recall of product attributes is enhanced when item-specific and relational processing of the target brand are ensured. Studies also show that recognition and cued recall reflect item-specific processing of the target product information (Theories and processing differences in recall and recognition are discussed in the Hypothesis section at length).

Judgments

Research evidence suggests that product judgments should be enhanced when both types of processing occur during the encoding of ad claims (Malaviya, Kisielius, and Sternthal, 1996; Malaviya, Meyers-Levy, and Sternthal, 1999). Item-specific processing requires focusing attention on specific features in the ad leading to the perception of distinctiveness of product information. However, this information alone does not guarantee whether these attributes are unique to the

target product or not. In order to render a firm basis for product judgment, a more comprehensive assessment of target brand attributes is required. This can be accomplished by engaging in relational processing which is to evaluate target brand information by comparing and contrasting this with information common to other brands in the same category.

To clarify this point, suppose subjects are exposed to an ad for a Sony digital camera that claims that the brand provides 5 megapixel resolution and automatic light adjustment. Item-specific processing of these attributes should affect the assessment of the advertised brand by facilitating access to these specific features that the brand claims to possess. However, access to this information alone does not provide a basis for inferring whether these features are unique to the target brand, and thus provides a basis for determining preference. The features common to most brands in the product category should be accessible if a sufficient relational processing has occurred, because such processing can facilitate thoughts about the shared features of the product category. For example, other brands have 4 megapixel resolution and automatic light adjustment. By comparing these category features with those made accessible about the target brand, the distinctiveness of the target brand features are identified. To the extent that the features of the target brand are viewed as desirable, judgments should be highly favorable.

Malaviya et al. (1996) suggested that item-specific and relational processing can influence product judgments as well as ad memory. Malaviya et al. (1996) found that, when the target ad presented attribute focused information

facilitating item-specific processing, the evaluation of the brand was more favorable than the ad that was embedded in the context which promoted relational processing (i.e., competitive ads from the same product category). In a similar vein, when the target ad encouraged relational processing by depicting category related information, the ad context consisting of non-competitive ads (i.e., thereby inducing item-specific processing) was more effective in producing favorable target brand evaluation. This indicates that a lack of either type of processing may decrease favorable target brand judgments.

To summarize, consumers might engage in either one of the two or both of the two types of encoding of incoming product information. By ensuring a certain level of both types of encoding through various marketing communication strategies, advertisers might be able to enhance product memory and favorable attitudes toward their brands, eventually leading to an increased likelihood of product purchase.

However, the amount and type of elaborative processing available during encoding may be determined by a number of individual and situational factors. However, a relatively small number of studies have investigated what kinds of factors influence consumer utilization of different types of encoding with few exceptions (Lee and Sternthal, 1999; Tavassoli, 1998). Cognitive elaboration is "the process of associating new information with knowledge already stored in memory" (Greenwald and Leavitt, 1984) and it seems likely that elaborative processing during encoding requires a certain level of cognitive resources consumers bring to the processing (MacInnis and Jaworski, 1989; Petty and

Cacioppo, 1986). Apparently, the most important candidate for cognitive resources is consumer prior knowledge and, in this sense, it is worthwhile to consider the role of consumer knowledge within the item-specific-relational processing framework.

CONSUMER KNOWLEDGE

For many years in consumer research, there has been a substantial amount of research on the role of product knowledge in various aspects of consumer behavior (Alba, 1983; Bettman and Park, 1980; Brucks, 1985; Cowley and Mitchell, 2003; Johnson and Russo, 1984; Maheswaran and Sternthal, 1990; Srinivasan and Ratchford, 1991; Srull, 1983; Sujan, 1985).

Alba and Hutchinson (1987) suggest that familiarity and expertise are two separate components of product knowledge. HK consumers are said to have decision strategies and cognitive skills that are different from those who are less knowledgeable (de Bont and Shoormans, 1995; Huffman and Houston, 1993; Shanteau, 1992a, 1992b). HK individuals tend to have more product knowledge in memory and more associations within that organized knowledge than LK individuals (Mitchell and Dacin, 1996) and HK individuals are more aware of both the existence of product attributes and the importance of specific pieces of product information (King and Balasubramanian, 1994; Punj and Staelin, 1983). In contrast, LK individuals consider product specific information much less involving (Anderson and Jolson, 1980; Beattie, 1983) and find that attribute oriented thoughts are more difficult to process (Edell and Mitchell, 1978; Maheswaran and Sternthal, 1990; Wright, 1975).

Defining and Measuring Consumer Knowledge

Different researchers have defined consumer knowledge in different ways such as familiarity (Alba and Hutchinson, 1987; Johnson and Russo, 1984; Park and Lessig, 1981; Raju and Reilly, 1979), expertise (Alba and Hutchinson, 1987), usage experience (Marks and Olson, 1981), subjective knowledge (Bettman and Park, 1980; Flynn and Goldsmith, 1999), and objective knowledge (Brucks, 1985, 1986).

Generally, there are two major approaches for operationalizing product knowledge: objective knowledge and subjective knowledge (Brucks, 1985; Park, Mothersbaugh, and Feick, 1994). According to Park et al. (1994), objective knowledge is "specific information about a product class stored in memory" and subjective knowledge is "people's perceptions of what or how much they know about a product class." They suggest viewing objective knowledge as an ability factor and subjective knowledge as a motivational factor.

While some researchers have often viewed subjective knowledge as a surrogate for objective knowledge, other researchers have differentiated these constructs (Brucks, 1985; Park and Lessig, 1981). These researchers suggest that the mechanisms through which subjective and objective knowledge affect information search and processing may be different. For example, objective knowledge contributes to understanding the impact of memory contents on the decision maker’s evaluation and choice decisions; the latter provides information about decision makers’ systematic biases and heuristics in choice evaluations and decisions (Park and Lessig, 1981). Park et al. (1994) found that product

information was more related to objective than subjective knowledge whereas product experience was a more influential determinant of subjective than objective knowledge.

In their review study, Alba and Hutchinson (1987) divided consumer knowledge into two major components: expertise and familiarity. Expertise is "the ability to perform product related tasks successfully." In this definition, the qualitative aspect of consumer knowledge is incorporated. In contrast, product familiarity is defined as "the number of product related experiences that have been accumulated by the consumer." Product familiarity is a quantitative construct and closely resembles the concept of experience used in early studies.

Product familiarity, however, has been conceptualized and operationalized differently by different researchers (Sirgy, 1981 for a review). In the unidimensional approach, Park (1976) measured product familiarity in terms of subjects' agreement with statements about the product. Raju and Reilly (1979) measured a self reporting of "frequency of use, overall familiarity, knowledge of how to select best brand" as an indicator of product familiarity. Also, Park and Lessig (1981) regarded product knowledge in terms of product familiarity and defined it as how much product experience consumers have.

By the way, Johnson and Russo (1981, 1984) employed a self report rating measure about automobiles and Tan and Dolich (1981) measured product familiarity with respect to the proportion of brands in the product category that consumers are aware of. In contrast, other researchers define consumer knowledge with respect to product familiarity in a multidimensional manner

(Conover, 1982; Marks and Olson, 1981; Kanwar, Olson, and Sims, 1981; Olson and Muderrisoglu, 1979; Sirgy, 1981). Based on the cognitive theory involving cognitive structures, Marks and Olson (1981) defined consumer knowledge as product familiarity which is increased with various product related experiences and eventually leads to cognitive structures for the product. These structures are characterized in terms of dimensionality, articulation, and abstraction. According to them, HK consumers are assumed to have more dimensions, make finer discriminations along the dimensions, and have more abstract knowledge as well as concrete knowledge than LK consumers. Therefore, the more knowledge the individual has about the product, the more highly developed the cognitive structure (Zinkhan and Muderrisoglu, 1985). More recently, Sirgy (1981) suggests considering product familiarity within an individual's cognitive structures and proposes eleven dimensions of beliefs describing product familiarity.

Another way to look at consumer knowledge is proposed by Frey and Foppa (1986). Frey and Foppa (1986) proposed a new type of knowledge, personal knowledge which is defined as "what a particular individual takes to apply to himself, and which is therefore taken into consideration for his own behavior." Personal knowledge is different from subjective knowledge in that much of what is subjectively known is not accepted for oneself and personal knowledge may deviate over an extended time period from subjective knowledge. For example, when asked whether hang gliding is dangerous, hang glider flyers answer that it is not, provided that one sticks to the rules and is careful. Objective or subjective knowledge seems to be irrelevant to them because they refer it to a

different basis or set. Frey and Foppa (1986) suggest analyzing the systematic biases in knowledge that an individual thinks applies to him (personal knowledge) and what counts as objective and subjective knowledge. They assert that human decision making is fully explained by taking into account both constraints and personal knowledge. In order to explain and predict consumer behavior, the constraints determining the possibility set should be analyzed clearly and how consumers construe and perceive the constraints in a given situation needs to be fully understood. For consumer researchers, in addition to understanding the role of objective and subjective knowledge, exploration of the role and the relationship between constraints and personal knowledge will be crucial in understanding the consumer decision making process.

Given the multidimensional nature of consumer knowledge consisting of objective and subjective knowledge, familiarity, and product experience, efforts were made to conceptualize and measure multidimensional aspects of consumer knowledge and relate relevant components to different product related tasks (Kanwar et al., 1981; Philippe and Ngobo, 1999). Several studies have shown that different measures of knowledge produced different predictions about consumer response. For example, Brucks (1985) describes three categories of consumer knowledge: subjective and objective knowledge and prior experience with the product category. Brucks (1985) found that subjective knowledge was not related to the number of attributes used when making choices while objective measures of knowledge was positively related to the amount of information search. Cowley (1994) found four measures of expertise, familiarity, experience, subjective and

objective knowledge were highly correlated with each other ranging between .71 and .88. Selnes and Grφnhaug (1986) also found a somewhat positive relationship between subjective and objective knowledge (.38). They argued that objective knowledge is preferable when focusing on differences in ability among consumers, while subjective knowledge is better suited when research examines motivational aspects of product knowledge. Cole, Gaeth, and Singh (1986) found three measures of product knowledge (objective and subjective knowledge and usage experience) are correlated and provide a relatively high degree of construct validity.

Recently, Philippe and Ngobo (1999) conceptualized knowledge as familiarity, objective product category information, subjective and objective expertise. They found that each component of knowledge affected various cognitive tasks differentially. Therefore, it seems that consumer knowledge should be defined and measured carefully reflecting the multidimensional characteristics and that researchers should interpret different aspects and roles of consumer knowledge appropriately with respect to relevant information processing tasks involved.

Knowledge Structure and Content

Consumer knowledge is generally considered with respect to both its content and structure (Beattie, 1983; Dacin and Mitchell, 1986). Structure refers to how information within a domain is organized in memory. In a network model of memory, knowledge structure is presented with nodes (concepts such as brands and attributes) and links that connect the nodes (the type and the strength of the

association between the concepts) (Anderson, 1983; Cowley and Mitchell, 2003). The content of product knowledge is specific information about a product class and about particular brands in memory. The product knowledge may also include usage occasions, the ability to discern between product alternatives, product judgments (Selnes and Grφnhaug, 1986).

In general, it appears that consumers with high product knowledge have a larger amount of knowledge (Alba and Hutchinson, 1987), have more organized structures of knowledge (de Bont and Schroomans, 1995; Fiske, Kinder, and Larter, 1983; Marks and Olson, 1981), and are more knowledgeable about product subcategories than low knowledge consumers (Sujan, Sujan and Bettman 1988).

Knowledgeable individuals generally have more nodes of knowledge, and the nodes contain more concepts (Fiske, Kinder, and Larter, 1983). In addition, as they become more knowledgeable, their knowledge structure becomes more organized. That is, high knowledge individuals may contain more concepts, more linkage among the concepts, and more tightly organized knowledge structures. In terms of knowledge structure, de Bont and Schroomans (1995) suggested that HK consumers have a more detailed structure of product information. This cognitive structure tends to facilitate finer discrimination between information units. When asked to evaluate product concepts (e.g., a filtered coffee maker), they found that HK consumers elicited more articulated evaluations than LK consumers. In addition, the evaluations of HK consumers are more internally consistent and more stable than those of LK consumers.

Dacin and Mitchell (1986) used both elicitation and questionnaires to examine differences in the content and structure of knowledge about motorcycle between HK and LK individuals. They found that significantly more statements were elicited from HK consumers than LK consumers. As expertise increases, an increasing percentage of motorcycle knowledge is specific knowledge. In terms of structure, it seems that HK consumers have very complex knowledge structures and have developed separate knowledge structures for different types of knowledge about motorcycles. Their structures were hierarchical and more tightly knitted. Also HK consumers have more associations with the different motorcycle brands, types and models than LK consumers. It was found that HK consumers based their evaluations of the motorcycles on careful consideration of the characteristics of the motorcycles, whereas LK consumers based their evaluations on external sources, such as friends or ads.

To recapitulate, HK and LK consumers differ in the content and structure of product knowledge; HK consumers have more complex and organized knowledge structure equipped with more sophisticated and detailed product information. This difference will likely be manifested in various aspects of product information processing such as encoding, retrieval, and product evaluations.

Knowledge Processing

The most commonly accepted model of knowledge in memory is the associative network model (Collins and Loftus, 1975; Anderson and Bower, 1973). In this model, concepts such as products and attributes are depicted as

nodes with some level of activation while the links connecting the nodes denote the type and the strength of the association between the concepts. The associative network model involves an activation process which assumes that specific nodes of the network are activated and the activation then passes through linked nodes (Collins and Loftus, 1975; Anderson, 1976). The spreading activation process of memory has been used in understanding the organization and retrieval of brand information in consumer behavior area (Mitchell, 1982; Cowley and Mitchell, 2003).

In the spreading activation model, activating a particular node produces an emanation of activation passing through all the connected nodes. If the amount of activation that reaches a specific node surpasses some threshold level, then the node will become activated (Anderson, 1983). The spread of activation depends on two factors; the strength of a link and the number of links. First, links have different levels of strength which represents the degree of relationship between concepts. The stronger the link, the more activation spreads to the connected nodes. Second, the number of links connected to a particular node affects spreading activation. Thus, the probability of retrieval of a particular node is equal to the strength of that link divided by the sum of the strengths of the other links connected to the activated node (Anderson, 1983). This suggests that nodes with a smaller number of links give nodes connected to them more activation than do nodes with a large number of links. However, the number of links does not influence activation of the target node if concepts connected to the target node are related to each other.

Using the spreading activation model, Cowley and Mitchell (2003) examined how HK and LK consumers organize and retrieve brand information given usage situations. The study found that LK consumers tend to organize brand information appropriate for a usage situation at encoding whereas HK consumers learn and store brand information by subcategories appropriate for different usage situations. Therefore, LK consumers were likely to retrieve the same set of brands regardless of the usage situation at the time of retrieval. In contrast, HK consumers could retrieve the brands appropriate for the usage situation at retrieval.

To summarize, knowledge consists of nodes and links. Processing in semantic networks may evoke spreading activation. In spreading activation, the amount of activation that emanates from one node to another depends both on the strength of the link between concepts and on the number of links.

Consumer Knowledge and Information Processing

As discussed previously, HK individuals are characterized as having more domain specific information which is more organized than that held by the LK individuals (Alba and Hutchinson, 1987; Fiske, Kinder, and Larter, 1983). These differences between HK and LK individuals with respect to the amount of product knowledge and structure inevitably result in different processing strategies and outcomes such as recall and recognition of information presented and product judgments. HK individuals will have a more comprehensive schema for the domain compared to LK individuals. A richer content and better organized

structure of HK consumers will likely facilitate encoding and retrieval of product information.

Many studies have confirmed that product knowledge in consumer's memory affects information processing activities such as selective processing (Maheswaran and Sternthal, 1990; Shanteau, 1988, 1992a), memory (Alba, 1983; Cowley, 1998, 2002; Srull, 1983; Zinkhan and Muderrisoglu, 1985), information search (Brucks, 1985; Punj and Staelin, 1983; Srinivasan and Ratchford, 1991), new information acquisition (Chiesi, Spilich, and Voss, 1979; Johnson and Russo, 1984; Wood and Lynch, 2002), cue utilization (Blair and Innis, 1996; Rao and Monroe, 1988; Rao and Olson, 1990; Rao and Sieben, 1992), product choice and judgment (Bettman and Park, 1980; Johnson and Russo, 1984; Maheswaran and Sternthal, 1990; Park and Lessig, 1981; Sujan, 1985), elaboration processes (Brucks, 1985; Sujan, 1985; Celsi and Olson, 1988), and confidence in decision (Park and Lessig, 1981; Spence and Brucks, 1997).

Processing Differences between HK and LK consumers

Considerable research in consumer behavior has examined the relationship between product knowledge and the types of message processing. HK consumers are more selective in the information they acquire (Johnson, 1988; Shanteau, 1992b), agree more than novices regarding what information is important (Shanteau, 1988), and prefer specific attribute information to benefits (Maheswaran and Sternthal, 1990).

Differences in information processing between HK and LK consumers can be characterized in several ways as follows. First, LK individuals are likely to

focus on literal information from the message whereas HK individuals tend to elaborate upon the message information by evaluating it in relation to their product knowledge (Chi, Feltovich, and Glaser, 1981; Johnson and Russo, 1984). Devine and Kozlowski (1995) suggest that HK individuals appear to be able to quickly and accurately access a large amount of domain specific knowledge and elaborate on this to come up with appropriate evaluations. Since HK consumers possess a richer knowledge base and have a large cognitive capacity, they are more likely to connect information from messages to previously learned information about the product (Alba and Hutchinson, 1987). Research suggests that the more knowledgeable the consumer is about the product of interest, the more information for decision making can be drawn from prior knowledge (Coupey, Irwin, and Payne, 1998). Brucks' findings (1985) also confirm this assertion that increase in subjective knowledge was associated with reduction in the utilization of salesperson recommendations.

Second, due to a lack of specific attribute information, LK consumers consider product specific information much less interesting (Anderson and Jolson, 1980), find it difficult to elicit attribute-oriented thoughts (Edell and Mitchell, 1978; Wright, 1975), and are more likely to engage in category and stereotype based processing (Sujan, 1985). Related studies where HK and LK subjects were asked to describe a target object suggest that HK subjects find attribute statements informative, whereas LK subjects consider benefit statements informative (Beattie, 1983; Conover 1982; Maheswaran and Sternthal, 1990; Walker, Celsi, and Olson 1987). For example, Walker et al. (1987) noted that HK consumers

tended to use technical attributes in distinguishing among food items, whereas LK consumers evaluated the items based on benefit information such as general and abstract consequences of product use.

In a similar vein, Maheswaran and Sternthal (1990) examined how consumer knowledge affects consumer's message processing. They presented different types of ad messages, 1) attributes only, 2) benefits only, and 3) attributes and benefits messages and asked subjects to evaluate them. The study found that HK consumers are more likely to process attributes only messages in more detail and evaluate more positively than other types of messages because they possess more product information and the ability to infer benefits from the attribute messages. In contrast, LK consumers tend to evaluate benefits only and attributes and benefits messages more positively than attributes only messages. Similarly, Sujan (1985) found that novices tend to use category-based processing more than experts both when information is consistent with and discrepant from category expectations. However, depending on whether product information matches category knowledge or not, experts engage in both category-based and the more analytical, attribute based processing. As Alba and Hutchinson (1987) noted, a technical attribute focus is likely to be effective for HK consumers because they are able to infer the related benefits and find technical description to be more convincing. In contrast, ads directed at LK consumers should be structured around easily comprehended benefits.

Third, another important difference between HK and LK consumers is the ability of HK consumers to tell what is relevant and important from what is not

because HK consumers have extensive and up-to-date content knowledge (Punj and Staelin, 1983; Shanteau, 1992a). Thus, HK consumers tend to be selective and use information that is the most relevant and diagnostic when making decisions (Bettman and Park, 1980; Shanteau, 1988). Spence and Brucks (1997) found that, in an unstructured information situation, HK consumers were better than LK consumers at selecting and evaluating inputs and their decisions exhibited less variance and they were less likely to make errors. More recently, Bei and Widdows (1999) noted that HK consumers may distinguish easily between simple and complex information. They found that HK subjects were more likely to be persuaded by complex product information than by simple information. In their study, HK subjects did not trust simple information because they already knew more than the information provided.

Consumer Knowledge and Product Memory

Prior research indicates that consumers with high and low product knowledge are different in the content, organization, and amount of product information in memory. These differences between HK and LK individuals may produce different processing strategies and outcomes such as recall and recognition of information presented and product judgments.

Several studies in psychology exhibit how different amounts and structures of domain knowledge affect retrieval of domain information (Anderson, 1981; Chiesi, Spilich, and Voss, 1979; Spilich, Vesonder, Chiesi, and Voss, 1979). For example, Spilich et al. (1979) studied text processing by individuals who differed in their knowledge of a particular domain (e.g., the baseball game).

The results indicate that, for domain related text, HK individuals not only recalled more information than LK individuals, but the information recalled by the former was more related to the significant structural elements of the subject matter. These results seem to be due to the fact that HK individuals have knowledge of the various patterns of actions and state changes that may occur. However, LK individuals have information which is unsophisticated and unorganized and have trouble because of an inability to integrate the sequence of actions and state changes (Voss, Vesonder, and Spilich, 1980). Most recently, Long and Prat (2002) asked subjects to read coherent tests that contain information about a specific domain for recall. The results noted that those who were knowledgeable about the domain recalled more information from the text than low knowledge subjects.

In consumer research, many researchers have examined the relationship between product knowledge and learning and product memory (Alba, 1983; Okechuku, 1992; Srull, 1983; Cowley, 1994, 2002). Alba (1983) speculated that one's ability to comprehend and recall information relevant to some domain varies as a function of the amount of knowledge one possesses with respect to that same domain. In his study, subjects were asked to comprehend information about a new stereo system in the ad and their evaluation and recall were measured. Consistent with previous research, consumers with high subjective knowledge recalled significantly more idea units than low knowledge subjects. Also HK subjects recalled more complex information than LK subjects. Srull (1983) found that HK subjects recalled and recognized more items than LK subjects. High

knowledge subjects also manifested much greater brand clustering than LK subjects. Zinkhan and Muderrisoglu (1985) hypothesized that HK consumers will be able to activate more concepts from memory to use in interpreting the incoming product information. In their study, subjects were exposed to one of two radio ads (automobiles and stereo systems) and were asked to recall after one day. They found that product familiarity is positively related to higher attribute recall. Recently, Philippe and Ngobo (1999) also found that free recall of product information about wine is affected by familiarity, objective knowledge, and subjective expertise.

Consumer Knowledge and Cognitive Responses

Cognitive responses are thoughts that are elicited while processing incoming information in relation to recipients' values and beliefs. Cognitive responses have been used by many researchers to provide evidence related to the effects of ad messages on product evaluations (Chattopadhyay and Alba, 1988; Greenwald, 1968; Maheswaran, 1994; Sujan, 1985; Wright, 1973, 1980). Wright (1973) asserts that consumers tend to compare the external information to their existing beliefs and values. These comparison processes simultaneously generate cognitive responses which are primary indicators of message acceptance.

Research has shown that people with different levels of product knowledge tend to elicit different types and amount of cognitive thoughts (Edell and Mitchell, 1978; Sujan, 1985). For example, Sujan (1985) studied information processing by experts and novices who were faced with products that matched or mismatched a category label. Results indicate that LK subjects generally used

more category-based processing than HK subjects did for both the match and mismatch conditions. It was also found that HK subjects generated more total thoughts and more attribute oriented thoughts than LK subjects. Celsi and Olson (1988) asked HK and LK subjects to examine ads for tennis rackets, shoes, and racquet strings. The study found that subjects with high domain knowledge generated more product related thoughts than LK subjects. Also consumers' domain knowledge was significantly related to the amount of their cognitive elaboration (product related inferences).

Similarly, Maheswaran and Sternthal (1990) found that HK subjects produced more attribute oriented thoughts than LK subjects whereas LK subjects generated more category based thoughts than HK subjects when processing attribute based messages. Also Graeff (1997) showed in a laboratory study that HK subjects were more likely to form inferential thoughts than LK subjects due to their greater familiarity with the target product in general. HK subjects formed significantly more inferential thoughts than LK subjects.

Consumer Knowledge and Product Evaluation

Research has revealed that HK and LK consumers differ in their ability to comprehend incoming information and to discern important information from less important ones, which may affect their product evaluations (Herr, 1989; Maheswaran and Sternthal, 1990). For example, in Maheswaran and Sternthal's (1990) study, the attribute only ad produced more favorable evaluations for HK than for LK consumers. This is because LK consumers' limited prior knowledge prevents them from appreciating product attributes in the ad, which results in less

favorable product evaluations in response to the attribute only message. More recently, Maheswaran et al. (1996) found that LK consumers evaluated the target brand in a comparison format more favorably than in a noncomparison format. For HK consumers, however, the evaluations were the same regardless of whether the competitive brand information was present or not.

Consumer Knowledge and Confidence

It is generally assumed that confidence in decisions will increase with consumers' product knowledge. Confidence has been studied by many researchers as as important indicator of processing differences between HK and LK consumers (Lee, Hong, and Lee, 2004; Park and Lessig, 1981). HK consumers are more likely to elaborate on information during encoding and they are aware that they know a lot about a product category (Cowley, 2004). Hence, HK consumers are more likely to be confident in their ability to process and retrieve information and make product decisions.

Park and Lessig (1981) found that decision makers' confidence in their choice decision increases monotonically with their level of familiarity with the product choice task. Biswas and Sherrell (1993), when asking HK and LK consumers to estimate prices of two product categories, found that HK consumers exhibit greater confidence in price estimates than LK consumers. Also, Spence and Brucks (1997) examined confidence in judgments between experts and novices and found that experts had greater confidence in their market value estimates than novices. In their study, participants were asked to specify a price range they thought a target product could be sold. Experts exhibited a smaller

value range than novices, which implies a greater confidence of the decision maker in his/her ability. Cowley (2004) found that HK consumers were more confident in recognition of product attributes than LK consumers, which in turn influenced brand attitude.

Most recently, Lee, Hong, and Lee (2004) assert that the effect of product knowledge on choice confidence is expected to be more influential in an online shopping environment than in a traditional shopping environment. They proposed that for LK consumers, attitudes toward the Web site may affect confidence in choices because it may function as another cue to differentiate among alternatives and as a mechanism to reduce consumers' discomfort in an online environment. However, HK consumers, who are well equipped with a framework for analyzing alternatives and experiences with the product, attitudes toward the Web site does not influence product choice in the virtual environment.

In summary, studies on the role of consumer knowledge in information processing suggest that consumers with different levels of product knowledge exhibit different processing patterns and outcomes. Due to a limited amount of content and a weak knowledge structure, LK consumers are less likely to memorize and appreciate incoming product information properly than HK consumers and will rely on less specific, categorical product information. In contrast, HK consumers are more likely to utilize both specific attribute and category based processing leading to better memory and product evaluations and a higher confidence in decisions because they have sufficient amount of product information and well organized knowledge structure.

COMPETITIVE AD CONTEXT

Given the competitive environment, marketers have attempted to increase advertising effectiveness by improving consumers' product memory. For advertising to work, appropriate brand information has to be remembered and retained over time (Keller, 1993). Most of the studies on ad context effects in consumer memory for ads have focused on interference caused by competitive brands in the same product category (Burke and Srull, 1988; Keller, 1987, 1991a, 1991b; Kumar, 2000). The basic argument is that when various brands are advertised within a product category, unconnected ad memory traces may result such that consumers find it difficult to remember which ad is associated with which brand in the category. In studies, interference effects were found when people were exposed to different print ads with similar ad claims or brand names (Burke and Srull 1988; Keller, 1987, 1991a, 1991b). Such ad interference was also found when television commercials were examined (Kent and Machleit, 1992; Kumar, 2000).

Competitive ads are known to harm consumer's ad product memory, brand evaluation and preference. Given the negative effects of competitive advertising, attention has been directed toward theoretical approaches that could suggest ways of reducing these effects (Jewell and Unnava, 2003; Kent, 1997; Unnava and Sirdeshmukh, 1994).

One of the ways of dealing with the influence of competitive ad context is provided by the item-specific-relational processing perspective (Einstein & Hunt, 1980; Hunt & Einstein, 1981). Viewed from the item-specific relational

processing framework, competitive ad context renders both item-specific and relational processing opportunities whereas non-competitive ad context makes only item-specific processing readily available. In this sense, competitive ad context could benefit consumers in elaborating on target brand information. From this perspective, therefore, the role of consumer product knowledge in product memory, cognitive responses, evaluation, and confidence in evaluation will be well manifested if we consider different ad contexts where only item-specific processing is available (i.e., non-competitive ad context) or both item-specific and relational processing are available (i.e., competitive ad context).

CHAPTER III

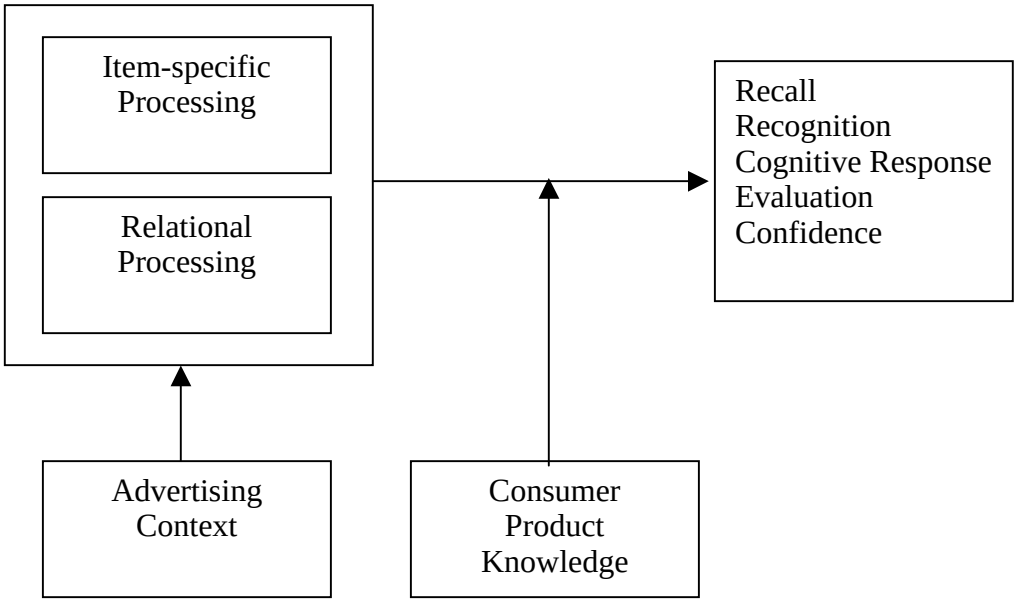
HYPOTHESES

Prior research has shown that a target ad should receive a certain level of both types of encoding (item-specific and relational) in order to be remembered well and evaluated favorably (Malaviya et al., 1996; Meyers-Levy and Malaviya, 1999). However, the impact of relational and item-specific processing on various decisions may not always be manifested due to consumers' differing ability to process incoming information. This study suggests consumer knowledge as an important factor to affect encoding, storage, and retrieval processes.

Therefore, the goal of the study is to investigate the effect of consumer product knowledge on facilitating these different types of processing in consumer decisions. Knowledge effects might be captured by examining encoding processes in competitive and non-competitive ad contexts. The reason is that the competitive ad environment may prompt both relational and item-specific encoding. In the competitive ad context, the target brand ad is presented along with ads for competing brands. The presence of competing brand ads may induce relational processing by making the product category salient and drawing attention to attributes shared by the brands presented. By comparing the target brand's attributes with those of competing brands, distinctiveness of the target brand can be manifested easily through item-specific processing. In the non-competitive ad context where the target brand ad is presented in the absence of competing brands in the same product category, only item-specific processing

will readily be encoded because there is no competing brand information presented to induce relational processing (see Figure 3.1).

Figure 3.1. Proposed Conceptual Model



In order to test the theorized effect of consumer knowledge in the item-specific-relational processing framework, the research design requires manipulating the occurrence of item-specific and relational processing. For this purpose, an encoding instruction of relational processing is introduced in both competitive and non-competitive ad contexts by asking subjects to elaborate on each brand in relation to competing brands available (i.e., either explicitly presented or stored in memory). This instruction along with ad context manipulation will ensure that all the subjects engage in item-specific and relational processing. The relational processing manipulation produces a critical

difference between the two conditions; in the competitive ad condition, relational processing is performed in the presence of competing brands whereas relational processing in the non-competitive ad condition is performed in the absence of competing brands.

To summarize, this study examines how consumer knowledge moderates message memory, cognitive responses, product evaluations, and confidence in evaluation in the item-specific-relational processing framework by considering situations where item-specific and relational processing are manipulated differently (i.e., ad context). The design of the study is presented in Figure 2.

Figure 3.2. Study Design

		Knowledge	
		High	Low
Ad Context	Non-Competitive (I)		
	Competitive (I+R)		

* R: Relational processing, I: Item-specific processing

* It may be argued that the study design should include a control condition (**competitive ad context without relational processing instruction (I+R)**) to rule out an alternative explanation for the hypothesized study results based on different amount of relational processing (because, according to the current design, **the competitive ad context with relational processing instruction is involved in I+R+R** whereas **the non-competitive ad context with relational processing instruction is involved in I+R**). However, previous research (Hunt and Seta, 1984; Malaviya et al., 1996) has shown that to the extent that memory and evaluations are likely to be highly favorable when both types of processing

co-occur, additional relational processing induced as a result of encoding instruction is likely to be redundant and should not significantly influence subjects' memory and evaluations. Therefore, the relational processing instruction in the competitive ad context is unlikely to affect product memory and evaluations in addition to the effect of item-specific and relational processing induced by the competitive ad context itself.

RECALL AND RECOGNITION

Recall and recognition measures have long been used in advertising as indicators of potential effectiveness (Bagozzi and Silk, 1983; Wedding and Leckenby, 1982; Zinkhan, Locander, and Leigh, 1986). Both memory researchers and consumer researchers have considered how the two different measures provide us about memory for information from ads (Lynch and Srull, 1982; Zinkhan, Locander, and Leigh, 1986) and an issue that has evoked considerable debates concerns the relationship between recall and recognition (Thorson, 1989).

There are two different theoretical perspectives that have been proposed to describe the relationship between recall and recognition (Tulving, 1976). The first approach is called two stage theory (or dual process theory, generation-discrimination theory, generate-recognize model, recollection (search or retrieval)-decision model) which is proposed by Kintsch (1970) and Anderson and Bower (1972). The theory suggests that recall and recog nition are basically different processes in that recognition serves a subprocess of recall and recall is assumed to include retrieval processes not present in recognition. The theory suggests that recall involves generation (or recollection, search, retrieval) of

possible information in memory. Each generated information is then subjected to a recognition task. The recognition task involves familiarity judgment which discriminates whether the information was included in the list or not. Therefore, according to this theory, recognition is easier than recall because information which a subject can recognize may fail to be recalled if it is not generated (Brown, 1976).

The second perspective indicates that recall and recognition are basically the same with respect to processes involved in utilizing stored information. The only difference between recognition and recall is the extent to which retrieval information (cues) are available to the subject. That is, in recognition, retrieval information is ensuredby the physical presence of to-be-remembered items whereas, in recall, the retrieval information comes from context cues other than the presence of the items (Lockhart, Craik, and Jacoby, 1976).

Dual process theories, however, have been attacked by empirical findings that retrieval processes operate in both recall and recognition (Mandler, 1980) and, in some cases, recallable items cannot be recognized (Tulving and Thompson, 1973). Dual process theories have been modified to incorporate these empirical findings such that both recall and recognition are assumed to be task- and content specific, and the underlying processes that are operative depend on contexts faced at the time of encoding and subsequent testing (Kelley and Jacoby, 2000). Mandler (1980) argues that item and relational information differently influence recall and recognition. Item specific information represents the memorial strength or familiarity of an event or object and can be accessed

directly. Relational information reflects contextual relations and its retrieval requires a recall-like search process. Mandler (1980) suggested that generation or recollection is supported by elaboration and relational processing whereas familiarity is a function of processing that focuses on integration of item-specific information.

Therefore, one basic idea is that item-specific processing will primarily increase recognition performance whereas both types of processing will benefit recall. Relational information may be useful in free recall because it provides information about a product category that must be specified to gain access to individual product information in memory during retrieval. Item-specific processing seems to encourage free recall by playing a discrimination function that leads to accurate information about a brand and helps distinguish it from information about another brand (Hunt and Einstein, 1981).

Recognition of ad claims can serve as a measure of item-specific processing because during recognition test ad claims are explicitly presented, thereby eliminating the need for subjects to generate categories or themes of claims and requiring only discriminative functions that item-specific processing can facilitate. That is, item-specific information may be useful in recognition, in that a specified link between a context cue and a target is useful in discriminating a unique target in memory. Therefore, accurate recognition of ad claims is heightened when conditions encourage item-specific processing (Einstein and Hunt, 1980; Kent and Machleit, 1990).

Recall

It has been suggested that HK individuals have more information in memory than LK individuals with respect to specific product information (brands, models, or subcategories, attributes), product usage experience, and thoughs and feeling about the product (Alba and Hutchinson, 1987; Mitchell and Dacin, 1996). HK individuals are also known to have better organized knowledge structure which can facilitate comprehending and relating incoming information with prior knowledge possibly leading to higher recall performance than LK individuals.

Many researchers have provided empirical evidence that HK individuals can recall more incoming information than LK individuals (Alba, 1983; Anderson and Pichert, 1978) and that knowledge operating during the encoding of the information ultimately affects what information is learned and remembered. For example, Chiesi et al. (1979) provide evidence that a more developed knowledge structure serves a framework for organizing information as it is encoded. Subjects with more elaborate knowledge structure perform better on a test of recall. The processes active during encoding appear to have less influence on subjects with less developed schemas. In Maheswaran's (1994) study, when asked to recall a description of personal computer, HK subjects recalled more attributes than LK subjects. Therefore,

H1: For both competitive and non-competitive ad contexts, HK subjects will recall more attributes than LK subjects.

This study asks subjects to elaborate on the target brand in relation to other brands in the same product category through relational processing instruction and therefore subjects in both non-competitive and competitive ad contexts are likely to engage in a certain level of item-specific and relational processing.

Recall is a function of a certain level of relational and item-specific processing and one indicator of relational processing in recall is the presence of recall intrusions (Malaviya et al., 1996). There seem to be two types of intrusions occurring during recall of target brand attributes. First, brand intrusions would be generated if attributes presented for competing brands are mistaken for target brand attributes. Second, category intrusions would be manifested if the salience of the product category and related cues are to prompt the activation of a typical brand's attributes that people later represent erroneously as features of the target brand.

HK subjects have a well organized knowledge structure as well as a high level of product information, usage experience, and feelings and thoughts about products in memory. This enables HK individuals to understand and relate easily incoming information with prior knowledge about the product category involved. Thus, when asked to form an evaluation about the target brand in relation to other brands in a non-competitive situation, HK subjects will be able to elaborate on the target brand features by comparing them with those of other brands stored in their memory. That is, HK subjects may engage in relational processing in the non-competitive ad context as much as in the competitive ad context.

Suppose one with high knowledge about digital camera is exposed to an ad for a digital camera while reading a consumer magazine. The ad presents specific features about the brand such as “DC 1800X is equipped with 6 megapixel resolution,” “it captures movie up to 35 mimutes,” “it offers a 16 MB memory stick with no additional cost to you.” Suppose also the ad says “compare our state of the art brand with other brands at your nearest store.” In this situation, HK subjects may be able to compare the brand with what they know about digital cameras. They may spontaneously realize that in the current market digital cameras usually are equipped with up to 5 megapixel resolution. They also know that the movie file length of 35 minutes is longer than that of other brands. However, the free 16 MB memory stick is not a good offering because other brands currently offer up to 32 MB memory stick for free. The elaborative processing is made possible without presenting direct competing brand information at hand because HK subjects have sophisticated and well organized knowledge about digital cameras in memory.

In contrast, LK subjects have a small amount of product information in memory (brands, models, or subcategories, attributes) and a poorly organized knowledge structure. With the insufficient and less specific product information and impoverished knowledge organization, LK subjects in the non-competitive ad context may not be able to elaborate on the target brand features in relation to competing brands appropriately, which may result in a poor relational processing, and eventually a poor recall of target brand attributes.

Suppose LK subjects are presented with the same ad as described above and are asked to compare the brand with competitive brands. Due to a lack of specific brand and attribute information in memory, they are less likely to engage in sophisticated elaboration on comparing the target brand with other brand information. They might not know how clear an image the 6 megapixel resolution results in or how good the 6 megapixel camera is compared to other brands. That is, without the explicit presence of competing brand information, it may not be possible for LK subjects to perform a sufficient level of relational processing. Since recall of target attributes is a function of the sufficient amount of both item-specific and relational processing, recall performance of LK subjects in the non-competitive condition will be lower than in the competitive condition.

In the competitive ad context, relational processing of competitive brands as well as processing of item-specific information about each brand is likely to be performed. For example, for both HK and LK subjects, target brand's resolution of 6 megapixel can be easily compared to competing brands' resolution (e.g., 5 megapixels for brand B and 4 megapixels for brand C). The target brand's features become distinctive through this elaborative processing and may be recalled well. As discussed above, since HK subjects will be able to elaborate on the target brand information by comparing it with competing brands regardless of whether competitive brand information is presented externally (i.e., competitive ad context) or not (i.e., non-competitive ad context), their recall performance in terms of amount of correct recall and intrusions may not be different between competitive and non-competitive ad context.

Meanwhile, for LK subjects, elaborating on both item-specific and relational information in the competitive ad context may lead to a greater target attribute recall, because the non-competitive ad context does not generate distinctive ad memory traces for LK subjects. However, although LK subjects may recall attributes of the target brand, due to their poorly organized knowledge structure, they are less likely to remember which attributes were associated to the brand in question in the competitive ad context. Therefore, LK subjects' amount of recall may be higher in the competitive ad context than the non-competitive ad context and at the same time there may be more intrusions in recall in the competitive ad context than in the non-competitive ad context.

H2: For HK subjects, there will be no difference in H2a) target attribute recall and H2b) brand and category intrusions between non-competitive and competitive ad context.

H3: For LK subjects, H3a) target attribute recall and H3b) brand and category intrusions will be higher in the competitive ad context than in the non-competitive ad context.

Recognition

Ad claim recognition can serve as an indicator of item-specific processing (Meyers-Levy, 1991). In a recognition test, subjects do not need to retrieve categories or cues for ad claims because ad claims are explicitly presented and subjects are required only to discriminate them, which item-specific processing

can facilitate. That is, item-specific information may be useful in recognition, in that a specified link between a context cue and a target is useful in discriminating a unique target in memory. Therefore, accurate recognition of ad claims is heightened when conditions encourage item-specific processing (Einstein and Hunt, 1980; Kent and Machleit, 1990).

Effects of prior knowledge on product memory have been small or null in studies using recognition (Alba, Alexander, Hasher, and Caniglia, 1981; Long and Prat, 2002) whereas studies using recall test have found a larger effect of knowledge (Alba, 1983; Srull, 1983). For example, Alba et al. (1981) found that if prior knowledge is activated at the time of learning subjects could recall significantly more ideas than do subjects whose knowledge is not activated. However, when given a recognition test and asked to rate statements on a 7-point scale, no difference was found across groups in ability to recognize statements. When asking subjects to remember brand-attribute statements, Cowley (1994) found that dramatic advantage in recall performance by high knowledge subjects is diminished when the task is recognition. The study found that the number of hits (correct recognition of target brand attributes) was the same between HK and LK subjects.

It appears that LK consumers are more likely to process each product attribute independently due to their lack of domain knowledge and a loosely organized knowledge structure. In contrast, HK consumers may be able to organize incoming product attribute information into their knowledge and tend to elicit richer inferences or concentrate on the gist of product information (Alba and

Hutchinson, 1987). Thus, any advantage resulting from more product knowledge will be diminished in recognition.

H4: There will be no difference in recognition of target brand attributes between HK and LK subjects.

There has been little research on effects of competitive ad context on recognition performance and findings have been equivocal. When showing subjects a pool of ads that contain the target ad either in the non-competitive context or in the presence of two competing ads, Malaviya et al. (1999) found that the presence of competing ads significantly decreased target brand name recognition. It is possible that confusions between target brand information and competing brand information may be increased in the competitive ad context than in the non-competitive ad context. The reason may be that viewing a target ad in a competitive ad context is likely to limit item-specific processing of the target to a modest level because exposure to a large number of ads would restrict attention to any particular ad.

In another study, however, Malaviya et al. (1996) found no significant difference in correct recognition of target brand attributes in competitive and non-competitive ad context. They, however, found that the number of false alarms (i.e., identifying attributes not described for the target brand but falsely recognizing them as mentioned in the target ad) is higher in the competitive ad context than in the non-competitive ad context. More recently, Law (2002)

demonstrated that repetition of similar ad claims in a competitive situation tends to increase recognition accuracy but it also increases recognition confusion.

These inconsistent findings have prevented researchers from concluding that competitive brand claims reduce correct recognition of target brand attributes. However, it is at least likely that the presence of similar ad claims in a competitive context induces confusions (false alarms) of target brand attributes. Therefore, the following hypothesis is suggested:

H5: Recognition confusion (false alarms) will be higher in the competitive ad context than in the non-competitive ad context.

Cognitive Responses

The presence of item-specific and relational processing can be assessed by examining subjects' cognitive responses. Malaviya et al. (1996) suggest that two types of processing at ad exposure can be manifested by assessing subjects' cognitive thoughts pertaining to target products. They found that item-specific processing of target camera was related to the number of target product thoughts such as target brand attributes (e.g., "it has a zoom lens," "it can take two pictures with one setting") whereas the presence of relational processing was indicated by category related thoughts such as thoughts about people, occasions, and photography.

HK subjects are likely to elicit more cognitive thoughts and more elaborative inferences than LK subjects. Also HK subjects' thoughts are more

attribute oriented than category based. In contrast, LK subjects' knowledge should consist of thoughts more about people, events, and objects associated with products than knowledge about specific brands and attributes. Their processing strategy is largely based on category and stereotypical information.

In this study, the relational processing manipulation for both competitive and non-competitive ad contexts will likely encourage subjects to engage in relational and item-specific processing. As discussed above, the two types of processing can be indicated by different types of cognitive responses. Item-specific processing will generate target attribute thoughts and simple evaluative thoughts. Relational processing is indicated by brand comparison thoughts and categorization thoughts

Different patterns of cognitive responses will result depending on the type of processing and the level of elaboration. A higher level of simple evaluative thoughts implies poor item-specific processing whereas a higher level of target attribute thoughts with decreasing simple evaluative thoughts indicates more elaborative item-specific processing. In the case of relational processing, the occurrence of more brand comparison thoughts indicates a higher level of elaboration involved. The greater proportion of categorization thoughts implies relatively impoverished relational processing.

Figure 3.3. Types of Cognitive Responses

Elaboration	Item-Specific Processing		Relational Processing	
	Cognitive Response	Example	Cognitive Response	Example
High ↕ Low	Target attribute thoughts	"It comes with a 32 MB memory which will store many pictures."	Brand comparison thoughts	"It provides a 5 megapixel resolution and is better than brand B."
	Simple evaluative thoughts	"It is good."	Categorization thoughts	"This digital camera seems to be better than other brands."

In the competitive ad context where item-specific and relational processing are readily available, HK subjects are able to elaborate on target brand in relation to competing brands explicitly presented. Relational processing will generate more comparison thoughts than simple categorization thoughts. As a result of item-specific processing, HK subjects will elicit more thoughts about target brand features than simple evaluative thoughts. In the non-competitive ad context where only the target brand information is explicitly presented, when asked to examine the target brand in relation to other brands, HK subjects will be able to elaborate on the target brand features by comparing them with those of competing brands stored in their memory. The enriched product knowledge and its well organized structure enable HK subjects to process target brand features easily in relation to competing brands in memory. That is, HK subjects may engage in relational processing in the non-competitive ad context as well as in the competitive ad context.

H6: In both competitive and non-competitive ad contexts, HK subjects will generate a greater amount of high elaboration thoughts (target attribute thoughts and comparison thoughts) than low elaboration thoughts (simple evaluative thoughts and categorization thoughts).

LK subjects in the competitive ad context are likely to exert item-specific and relational processing just like HK subjects do, because the presence of competing brands provide resources for comparing and evaluating distinctive features of the target brand.

However, in the non-competitive ad context, LK subjects will not be able to perform brand comparisons appropriately due to their lack of specific knowledge about competing brands in memory. In response to the relational processing manipulation, they will only be able to elaborate on the target brand using general category knowledge or stereotypical information related to the target product category. Due to this poor nature of relational processing, item-specific processing may also be less elaborative. LK subjects might generate more simple evaluative thoughts than target attribute related thoughts because there is a lack of resources for LK subjects to compare target brand's features with.

H7: LK subjects will generate a greater amount of high elaboration thoughts (target attribute thoughts and comparison thoughts) in the competitive ad context than in the non-competitive ad context.

Evaluation

Prior research on the effects of types of encoding suggests that product evaluations are the most favorable when the target ad receives both item-specific and relational processing (Malaviya et al., 1996; Meyers-Levy and Malaviya, 1999). An insufficient amount of either type of elaboration tends to decrease the favorableness of target product evaluations. If there is not enough item-specific processing, the evaluation tends to be affected by relational and categorical information which might lead to a less favorable evaluation due to a lack of access to distinctive features of the target brand (Mandler, 1982; Meyers-Levy and Tybout, 1989; Malaviya et al., 1996). Or, if elaboration is predominated by item-specific information without sufficient access to relational information, this might make it difficult to determine distinctiveness of features possessed by the target brand and would diminish favorableness toward the target brand (Malaviya et al., 1996, 1999).

Although the occurrence of both types of processing at encoding is likely to lead to better product evaluations, the effects may differ for HK and LK individuals due to their differences in the ability to process incoming information and retrieve it from memory for product evaluations.

As indicated, product evaluations appear to be influenced by the amount and content of retrieved information that is relatively accessible, and therefore, comes to mind readily at the time of evaluation formation. It is also likely that information that is perceived to be diagnostic or relevant to the task at hand influences evaluations. Consumers with high and low product knowledge seem to

differ in the amount and structure of product information and their perception of diagnosticity and relevancy of the information for decision making. HK individuals have more articulated and sufficient product information and well organized knowledge structure (Alba, 1983). HK consumers tend to engage in comprehensive processing of all of the information presented to them. They use more attributes and finer attribute levels to assess different brands in the same product category. A careful scrutiny of the attribute information enables HK consumers to obtain information that is more diagnostic of the product (Maheswaran, 1994).

Since HK subjects have more brand and attribute knowledge and tend to process information about alternative brands in greater depth, they are able to make refined relational evaluations, thus allowing them to evaluate products relative to other, appropriate members of the same category of products regardless of whether competing brand information is explicitly presented or not. That is, explicitly providing relation information may not improve HK subjects' elaboration or evaluation because the target brand ad in both competitive and non-competitive ad contexts features the same attribute information and HK subjects can easily infer relational information from their prior knowledge. Therefore, in this study, HK subjects will make evaluations of the target brand in competitive and non-competitive ad contexts similarly.

H8: HK subjects will evaluate the target brand favorably in both competitive and non-competitive ad contexts.

As in the case of competitive ad context, providing competing brand information for LK subjects to easily make comparisons of the target brand to competing brands will increase LK subjects' ability to process. This is because LK subjects' message processing and product evaluations may be enhanced by providing additional resources to base their evaluation on. However, when target brand information is presented without competing brand information (i.e., non-competitive ad context), LK subjects may not be able to reach an accurate product evaluation because a lack of relational information in knowledge prevents them from assessing distinctive features of the target brand in relation to other brands. That is, in the non-competitive ad context, LK subjects may not know whether features of the target brand are better than competing brand's features or not. Therefore, the following hypothesis is proposed.

H9: LK subjects will evaluate the target brand more favorably in the competitive ad context than in the non-competitive ad context.

Figure 3.4. Expected Product Evaluation in Different Experimental Conditions

		Knowledge	
		High	Low
Ad Context	Non-Competitive	Positive	Neutral
	Competitive	Positive	Positive

Confidence in Evaluation

HK subjects possess a greater amount of and more sophisticated brand and attribute information which can be utilized during encoding of incoming product information. This product knowledge enables them to assess and elaborate on the target brand even in the absence of competitive brand information (i.e., non-competitive ad context), which makes them feel as confident as they do in the presence of competing brand information (i.e., competitive ad context).

H10: HK subjects will feel confident in both competitive and non-competitive ad contexts.

For LK subjects, the non-competitive ad context where competing brand information is not externally available makes it difficult for them to evaluate the target brand appropriately because they do not have sufficient and relevant product category information stored in their knowledge to compare the target brand with. LK consumers feel less confident in their evaluations because the judgments made are based on insufficient resources. However, in the competitive ad context, LK consumers can process target brand information in greater detail because the competitive brand information serves as a basis for relational processing. That is, the co-occurrence of item-specific and relational processing in the competitive ad context will give LK consumers more opportunities to elaborate on incoming product information, which will ultimately increase

confidence in product evaluations. Therefore, the following hypothesis is proposed.

H11: LK subjects will feel less confident in the non-competitive ad context than in the competitive ad context.

Table 3.1. Summary of Hypotheses

Dependent Measure	Hypothesis	Condition	Prediction	Remarks
Recall	H1	Across ad contexts	HK > LK	Attributes
	H2a	For HK	Competitive = Non-competitive	Attributes
	H2b	For HK	Competitive = Non-competitive	Intrusions
	H3a	For LK	Competitive > Non-competitive	Attributes
	H3b	For LK	Competitive > Non-competitive	Intrusions
Recognition	H4	Across ad contexts	HK = LK	Hits
	H5	Across knowledge	Competitive > Non-competitive	False alarms
Cognitive Responses	H6	For HK	Comparison and target attribute thoughts > Categorization and simple evaluative thoughts	
	H7	For LK	Competitive > Non-competitive	High elaboration thoughts
Evaluation	H8	For HK	Competitive = Non-competitive	
	H9	For LK	Competitive > Non-competitive	
Confidence	H10	For HK	Competitive = Non-competitive	
	H11	For LK	Competitive > Non-competitive	

CHAPTER IV

METHODOLOGY

A total of three pretests and a main study were conducted to test the hypotheses proposed in the previous section. This section describes the study design, the sample, task, manipulation, and the constructs used to measure and test the hypotheses.

DESIGN

The study employed a 2X2 factorial design where knowledge level (High vs. Low) and ad context (Competitive vs. Non-competitive) are between subjects factors. Subjects formed either high or low knowledge group depending on measured product knowledge scores. Ad context was manipulated by stimulus ads.

SUBJECTS

A total of 129 undergraduate students at a southwestern state university participated in the study for extra course credits. The average age of subjects was 20.1 years and 22% were male.

STIMULUS DEVELOPMENT

The target product category should have enough variance in terms of consumer knowledge, it should interest student participants enough and should be relevant to them. A series of pretests (Pretests I, II, and III) was conducted to select an appropriate target product category and brand features to form stimulus

ads. Based on findings from pretests, laptop computers were chosen as the target product category in the main study (see Pretest Section for more detail).

The stimulus ads in the competitive ad context consist of 1 target ad, 2 competitive ads, and 1 filler ad whereas the non-competitive ad context includes 1 target ad and 3 filler ads. The stimulus ads in each ad context are presented in Figure 4.1.

Figure 4.1. Stimulus Ads in Competitive and Non-Competitive Context

Competitive Ad Context

order	1	2	3	4
ad	F	C	C	T

Non-Competitive Ad Context

order	1	2	3	4
ad	F	F	F	T

* T: Target ad, C: Competing ad, F: Filler ad

The target ad and the competitive ads are composed of nine attributes. The target brand has four attributes which are more favorable than those of the competitive brands and the other five attributes which are equal to or less favorable than those of the competitive brands. Therefore, the target brand is always the most favorable of all (seeApp endix B and Pretest III).

INDEPENDENT VARIABLES

Ad Context

Subjects are randomly assigned to one of the two ad context conditions.

Competitive ad context: Subjects are exposed to the target ad along with two directly competing ads and two filler ads.

Non-competitive ad context: Subjects are exposed to the target ad along with four filler ads describing brands which do not directly compete with the target brand.

Knowledge Measures

Consumer product knowledge was assessed by measuring objective and subjective knowledge and product related experience. Objective knowledge was measured using 13 multiple-choice questions. Subjective knowledge was assessed by adopting Flynn and Goldsmith's (1999) 5 seven-point scale items. Product related experience measures included product ownership, usage, and information search (Park, Mothersbaugh, and Feick, 1994). Ownership, usage, and search as indicators of product related experience is consistent with Alba and Hutchinson's (1987) conceptualization of product experience (see Pretest Section for more detail).

DEPENDENT VARIABLES

To assess the effects of consumer knowledge in the competitive and non-competitive ad context, multiple dependent measures were used including free recall, recognition, cognitive responses, evaluations, and confidence in evaluation.

Free recall

A free recall task asks subjects to record all the features of the target brand in the stimulus material that they could remember. The total number of attribute recalled for the target brand and intrusions from other brands and categories made by HK and LK subjects were assessed to test H1 and H2.

Recognition

Recognition of target ad claims was administered by presenting subjects with 4 correct statements taken from the target ad along with 5 foil statements. Three of the foils describe attributes presented in the competitive brand ads and the remaining 2 foil statements present attributes of the category that are not included in the stimulus material.

Cognitive Responses

Cognitive responses were collected to detect how HK and LK subjects differently elaborate on product information. The analysis followed a variant of the classification scheme suggested by Maheswaran (1994) and Malaviya et al. (1996). Subjects' thoughts were coded into relational processing thoughts (comparison and categorization thoughts) and item-specific processing thoughts (product attribute and simple evaluation thoughts).

Comparison and categorization thoughts represent relational processing. First, brand comparison thoughts (e.g., "this brand provides a 5 megapixel resolution and is better than brand B") are included. Relational processing thoughts also include thoughts that refer to the product category (e.g., "this digital camera seems to be better than other brands," "it has features of 35mm camera"), the people, occasions, and things that are related to the product category (e.g., "it is good for first time users," "it reminds me of last vacation"). Target brand related thoughts represent item-specific processing. These thoughts consist of target brand attribute thoughts (e.g., "this digital camera is easy to use," "it is light and convenient to carry") and simple evaluative thoughts (e.g., "it is good").

Product Evaluation

Subjects were asked to evaluate the target brand on five 9-point semantic differential scale items (Maheswaran, 1994; Malaviya et al., 1996). Items included were good/bad, favorable/unfavorable, of high quality/of low quality, like/dislike, and not at all useful/very useful.

Confidence in Evaluation

Confidence has been defined and studied in various ways related to persuasion (Brinol, Petty, and Tormala, 2004; Petty, Brinol, and Tormala, 2002), attitude (Fazio and Zana, 1978), learning (Tunney and Shanks, 2003), and product decisions (Park and Lessig, 1981; Yalch and Yoshida, 1983). In this research, confidence in evaluation was defined as a subjective sense of assurance with respect to one's evaluation. Subjects indicated their confidence in evaluation on three 7-point semantic scale items (Brinol et al., 2004; Lee et al., 2004).

EMOTION MEASURE

Many researchers have pointed out the effect of emotion in advertising processing (Edell and Burke, 1987; Holbrook and Batra, 1987; Olney, Holbrook, and Batra, 1991; Stout and Leckenby, 1986). It may be that competitive and non-competitive ad context elicit different emotional responses which could eventually affect product memory and evaluations in different ways. Acknowledging the importance of emotion in information processing, the

research will employ emotion measures as covariate and Mehrabian and Russell's (1974) PAD measures will be used.

PROCEDURE

An invitation email including the survey URL was sent to the subjects. Through a randomization technology implemented in the first page of the survey, subjects were directed to one of the two competitive ad contexts (competitive vs. non-competitive ad contexts). A product description in ad consists of model name (e.g., GT1500 laptop computer), tagline, and product features (e.g., nine attributes describing the brand). In the competitive ad context, the first ad was a filler ad and the other three ads described two competitive brands and one target brand. In the non-competitive ad context, the first three ads were filler ads and the last ad was for the target brand. Subjects were told that several well known manufacturers are planning to introduce new products and are interested in subjects' opinions about their brand. They were asked to read four product ads carefully at their own pace. After reading the ads, subjects were asked to evaluate each of the four brands on five 7-point scale items. Then, measures of confidence in evaluation, emotion, recall, cognitive response, recognition, objective knowledge, subjective knowledge, and product experience were followed. Finally, subjects were asked to indicate their age and gender.

PRETESTS

To test knowledge effects, target product categories should show enough variance with respect to consumer knowledge. Also, target product categories should be complex so that levels of consumer knowledge among subjects can be

assessed noticeably. Therefore, product categories with a wide range of important technical features and breadth of applications seem to be appropriate. A product category should also be known and available to most of the target subject group. Among a set of potential product categories to satisfy these criteria are digital cameras and laptop computers. A total of three pretests were conducted to test appropriateness of laptop computers and digital cameras (Pretests I and II) and validity of stimulus ads (Pretest III) for use in the main study.

Pretest I

In addition to the goal mentioned above, another goal of Pretest I was to select product attributes for constituting stimulus ads for the main study. To test the effect of consumer knowledge on product evaluation (H8 and H9), it was necessary to establish relative importance of product attributes so that the target brand is portrayed as being clearly superior to the competition as explained in the Stimulus Development section.

Subjects

A total of 89 undergraduate students (46 for laptop computers and 43 for digital cameras) at a southwestern state university participated in the study for extra course credits. The average age of subjects was 21.4 years and 28.3% were male.

Measurements

Subjects' objective and subjective knowledge about and experience with laptop computers and digital cameras were measured. Importance of product attributes was also assessed in Pretest I. Objective knowledge reflects stored

product information (Park, Mothersbaugh, and Feick, 1994) and is generally measured by using either open-ended questions (e.g., Brucks, 1985) or objective test questions (e.g., Johnson and Russo, 1984; Raju, Lonial, and Mangold, 1995). In the first two pretests, objective knowledge was assessed in two ways; 1) by adopting Brucks' (1985) six open-ended questions (Pretest I) and 2) by using multiple-choice questions (Pretest II). Flynn and Goldsmith's (1999) 5 seven-point scale items were used to measure subjective knowledge. Product related experience was measured by asking product ownership, usage, information search, and purchase experience (Park et al., 1994). Product attribute importance was measured on a nine-point scale (Zhang and Markman, 1998) anchored by "not at all important" (=1) and "very important" (=9).

Procedure

An invitation email including the survey URL was sent to the subjects. Through a randomization technology implemented in the first page of the survey, subjects were directed to one of two sites that include measurement items about either laptop computers or digital cameras. Objective knowledge was assessed first, then subjective knowledge, product related experience, and attribute importance measures were employed.

Results

Internal consistency of each knowledge measure was assessed with reliability analysis and Cronbach's alphas for each measure are shown in Table 4.1. With respect to measures of product related experience, there are four items asking about usage, information search, purchase frequency, and product

ownership. Usage and information search are measured on a 7-point scale, purchase frequency is measured on a 5-point scale, and ownership is binary. Because the items were measured on different scales, the scores were first transformed into z-scores in order to have a single index for the product related experience.

Table 4.1. Reliability Analysis of Knowledge Measures

Product Category	N	Objective Knowledge (# of items = 6)	Subjective Knowledge (# of items = 5)	Product Experience (# of items = 4)
Laptop computer	46	.55	.91	.83
Digital camera	43	.76	.90	.82

Summary results of knowledge measures for laptop computers and digital cameras are presented in Tables 4.2 and 4.3, respectively. With respect to laptop computers, scores for objective knowledge seem to be normally distributed with mean value of 4.2 and standard deviation of 1.14. This is indicated by the fact that Skewness and Kurtosis values of objective knowledge are within a range of two standard deviation scores. Subjective knowledge and product experience show distributions similar to that of objective knowledge. This suggests that laptop computers seem to have enough variance among subjects in terms of objective knowledge, subjective knowledge, and product experience. A similar pattern was found for digital cameras as shown in Table 4.3.

Table 4.2. Summary Results of Laptop Computers

	Objective Knowledge	Subjective Knowledge	Product Experience
Mean	4.2	3.8	.01
Standard Deviation	1.14	1.55	.82
Skewness	.220	.058	.196
Kurtosis	-.458	-.676	-1.388
Minimum	2.3	1.0	-1.04
Maximum	6.8	7.0	1.46

* N = 46
** SD of Skewness = .361; SD of Kurtosis = .722

Table 4.3. Summary Results of Digital Cameras

	Objective Knowledge	Subjective Knowledge	Product Experience
Mean	3.6	3.8	-.06
Standard Deviation	1.21	1.37	.77
Skewness	-.050	-.223	.125
Kurtosis	-.616	-.662	-1.322
Minimum	1.5	1.0	-1.16
Maximum	6.1	6.2	1.28

* N = 43
** SD of Skewness = .373; SD of Kurtosis = .747

Tables 4.4 and 4.5 provide importance ratings for attributes of laptop computers and digitalcamera s. Product descriptions for target and competitive brands for use in the main study were developed based on these ratings so that target brand is always superior to the other two competitive brands (see Appendix B).

Table 4.4. Attribute Importance of Laptop Computers

	Minimum	Maximum	Mean	Standard Deviation
Processor speed	5	9	8.3	.84
RAM	5	9	8.1	.97
Processor type	5	9	8.0	1.08
Battery Life	4	9	7.7	1.42
Warranty	4	9	7.6	1.55
Hard drive	5	9	7.4	1.12
Design	4	9	7.1	1.50
Weight	3	9	7.1	1.69
Brand	2	9	6.9	1.70
Screen size	1	9	6.6	1.52
Video memory	4	9	6.5	1.57

* N = 46

** not at all important (=1); very important (=9)

Table 4.5. Attribute Importance of Digital Cameras

	Minimum	Maximum	Mean	Standard Deviation
Megapixel	5	9	8.3	.99
Memory size	5	9	8.0	1.29
Warranty	4	9	7.7	1.34
Weight	5	9	7.5	1.36
Flash mode	2	9	7.4	1.79
Design	3	9	7.4	1.56
White balance	3	9	7.4	1.40
Digital zoom	3	9	7.4	1.45
Flash range	4	9	7.4	1.36
Optical zoom	2	9	7.2	1.62
Brand	2	9	6.8	1.67
LCD size	2	9	6.5	1.59
Shutter speed	2	9	6.3	1.84
Burst mode	1	9	6.0	2.08
Focal length	1	9	5.8	2.00
Aperture range	1	9	5.8	2.09
Self-timer	1	9	5.4	2.01

* N = 43

** Not at all important (=1); very important (=9)

Pretest II

Through the use of multiple-choice questions of objective knowledge, Pretest II was conducted to examine whether laptop computers and digital

cameras have large variance in product knowledge. In addition was an assessment of subjective knowledge and product experience of laptop computers and digital cameras.

Subjects

Advertising panel members were solicited to participate in the test and 222 valid responses (93 for laptop computers and 119 for digital cameras) were obtained. In order to compare the results with those of Pretest I, panel data were scanned in consideration of their ages and participants ages 19 through 35 were selected for analysis. This resulted in 45 cases for laptop computers and 62 cases for digital cameras.

Measurement

Items to measure objective knowledge of laptop computers were developed based on expert interviews and literature surveys. A total of 13 items were explored. Items for measuring objective knowledge of digital cameras were adopted from Chiou (2003) and went through expert interviews. Two of the original ten items were deleted due to ambiguity of the statements (see Appendix C). Measurement items for subjective knowledge and product related experience were the same as those used in Pretest I.

Procedure

Procedure was exactly the same as that of Pretest I.

Results

Summary results of knowledge measures for laptop computers and digital cameras are presented in Tables 4.6 and 4.7. Objective knowledge measures with multiple-choice questions in Pretest II reveal variance among subjects in product knowledge of laptop computers and digital cameras. Similarities in patterns between Pretests I and II are found by looking at distributions of subjective knowledge and product experience.

Table 4.6. Summary Results of Laptop Computers (Age: 19-35)

	Objective Knowledge	**Subjective Knowledge**	**Product Experience**
Mean	8.1	3.9	.05
Std. Deviation	2.26	1.42	.86
Skewness	-.205	.245	.983
Kurtosis	-.853	-.253	.854
Minimum	3	1	-.95
Maximum	12	7	2.67

* N = 45
** SD of Skewness = .354; SD of Kurtosis = .695

Table 4.7. Summary Results of Digital Cameras (Age: 19-35)

	Objective Knowledge	**Subjective Knowledge**	**Product Experience**
Mean	2.0	3.4	.04
Std. Deviation	1.38	1.52	.83
Skewness	.388	.228	.279
Kurtosis	-.772	-.736	-1.192
Minimum	.00	1.0	-1.07
Maximum	5.00	6.8	1.67

* N = 62
** SD of Skewness = .304; SD of Kurtosis = .599

In consideration of results of Pretests I and II and by comparing the relevance of laptop computers and digital cameras with student subjects, laptop

computers were selected as a target product category appropriate for use in the main study.

Pretest III

Because the target brand is portrayed as being clearly superior to the other two competitive brands across all the conditions as discussed in the Stimulus Development section, it is necessary to check if subjects evaluate the target brand more favorably than the competitive brands. Pretest III was conducted to confirm this using laptop computers as a target product category. In the pretest, product descriptions were manipulated in two ways; top-of-the-line and average conditions. In the top-of-the-line condition, target and competitive brands were described as having high quality, and in the average condition all brands were described as being of average quality in the current market. The intent of this manipulation was to ascertain which product description condition better reveals processing differences between high and low knowledge subjects.

Subjects

Panel members were solicited to participate in the pretest and 107 valid responses (58 for top-of-the-line condition and 49 for average condition) were acquired. The average age of subjects was 39.8 and 43.1% were male.

Design

A 2 (Competitive ad context) X 2 (Product description) X 2 (Knowledge) between subjects design was employed.

Procedure

An invitation email including the survey URL was sent to the subjects. Through a randomization technology implemented in the first page of the survey, subjects were directed to one of four conditions (2 competitive ad contexts X 2 product descriptions). A product description in ad consists of model name (e.g., GT1500 laptop computer), tagline, and product features (e.g., 7-9 attributes describing a brand either as being one of high quality or average quality). In the competitive ad context, the first ad was a filler ad and the other three ads described two competitive brands and one target brand. In the non-competitive ad context, the first three ads were filler ads and the last ad was for the target brand. Subjects were told that several well known manufacturers are interested in subjects' opinion about their brand. They were asked to read four product ads carefully at their own pace. After reading the ads, subjects were asked to evaluate each of the four brands on five 7-point scale items. Then, objective knowledge, subjective knowledge, and product experience were measured.

Results

Results indicate that portraying the brands as having average quality (average condition) does not reveal well the processing differences between high and low knowledge subjects. Therefore, analyses reported here are based only on the top of the line condition (N = 58).

Mean evaluation scores for the target brand and the competitive brands A and B in the competitive ad context are 7.0, 5.6, and 6.3 (Table 4.8). Paired samples t-tests were performed for the three brands and, as shown in Table 4.9,

subjects evaluated the target brand more positively than competitive brand A (t = 5.26, $p < .001$) and competitive brand B (t = 4.35, $p < .001$).

Table 4.8. Mean Evaluation Scores of Target and Competitive Brands

	Sample Size	Mean	Standard Deviation
Target	30	7.0	1.4
Competitive A	30	5.5	1.1
Competitive B	30	6.2	1.2

Table 4.9. Paired Samples t-test on Target and Competitive Brands

Paired Samples t-test	Mean Difference	Standard Deviation	t
1) Target and Competitive A	1.4	1.5	5.26**
2) Target and Competitive B	0.8	0.9	4.35**
3) Competitive A and Competitive B	0.7	1.2	2.99*

* $p \leq .01$, $df = 29$
** $p \leq .001$, $df = 29$

CHAPTER V

DATA ANALYSIS AND RESULTS

PRELIMINARY ANALYSIS

Knowledge Measures

As discussed above, product knowledge about laptop computers was measured in three ways including objective and subjective knowledge and product experience (see Table 5.1 for summary results of knowledge measurements). Subjective knowledge was measured using Flynn and Goldsmith's (1999) 5 seven-point scale items. Objective knowledge of laptop computers was assessed using 13 multiple-choice questions. For objective knowledge measures, item discrimination (Table 5.2) and item difficulty (Table 5.3) analyses were conducted. Item discrimination analysis indicates that each item properly discerns high and low knowledge groups. Item difficulty analysis shows that correct response rates of the items range between 33% and 83%, therefore, all items were included for further analyses.

Table 5.1. Summary Results of Knowledge Measures

	Objective Knowledge	Subjective Knowledge	Product Experience
Mean	7.2	2.8	.00
Std. Deviation	2.1	1.2	.7
Skewness	-.241	.723	-.066
Kurtosis	.217	.259	-1.28
Minimum	1.0	1.0	-1.26
Maximum	12.0	6.6	1.59

* N = 129

** SD of Skewness = .213; SD of Kurtosis = .423

Table 5.2. Item Discrimination Index

Item #	Low (N = 70)	High(N = 59)	Difference	D**
1	31*	61	30	.30
2	61	74	13	.13
3	27	64	37	.37
4	40	57	17	.17
5	60	81	21	.21
6	20	52	32	.32
7	41	69	28	.28
8	68	85	17	.17
9	47	73	26	.26
10	74	95	21	.21
11	31	68	37	.37
12	21	47	26	.26
13	41	75	34	.34

* Percentage of correct response
** Discrimination Index (D) = difference / 100%
*** D should not be negative or zero.

Table 5.3. Item Difficulty Analysis of Objective Knowledge

Item #	1	2	3	4	5	6	7	8	9	10	11	12	13
Correct Response (%)	45	67	44	48	69	34	54	76	58	83	48	33	56

With respect to measures of product related experience, there are four items asking about usage, information search, purchase frequency, and product ownership. Usage and information search are measured on a 9-point scale, purchase frequency is measured on a 5-point scale, and ownership is binary. Because the items were measured on different scales, the scores were first transformed into z-scores in order to have a single index for the product related experience.

Descriptive Analysis of Product Experience

Of the 129 subjects, 24 (18.7%) answered that they have searched for laptop information many times, whereas 80 (62.7%) have not done a great deal of

information search. However, half of the subjects (49.5%) indicate that they use laptop computers a lot whereas 29 (22.5%) answer that they hardly use laptop computers. Data show that 74 (57.4 %) own laptop computers. Of those who own laptops, 48.1 % own Dell, followed by HP and Sony. It is also found that most of the subjects (90.1%) have purchased one or two laptops during the last five years.

Correlations among Knowledge Measures

Table 5.4 provides correlations among the three measures of laptop computer knowledge. The results indicate that subjective and objective knowledge are positively correlated with each other (α = .411). It was also found that subjective knowledge and product experience are positively related (α = .338). However, objective knowledge and product experience are not related to each other (α = .088, n.s.).

Previous studies examining relationships among different types of product knowledge have demonstrated that there exists conceptual separability among different types of product knowledge. For instance, in examining the effect of product experience and objective knowledge on information search behavior, Punj and Staelin (1983) found that the correlation between these two variables is very low (0.03). Selnes and Gronhaug (1986), however, provide a significant correlation coefficient (0.38) between subjective knowledge and objective knowledge measures.

More recently, several researchers have investigated what discerns objective and subjective knowledge and found that objective knowledge depends more on stored product information, whereas subjective knowledge relies largely

on product-related experience (Park et al., 1994). Findings from this study are largely consistent with previous research in that 1) there is a distinction of objective knowledge, subjective knowledge, and product experience and 2) at the same time they are related with each other such that objective and subjective knowledge are highly correlated and product experience is an antecedent of subjective knowledge but not of objective knowledge.

Table 5.4. Correlations among Knowledge Measures

	Objective Knowledge	Subjective Knowledge	Product Experience
Objective Knowledge	-	-	-
Subjective Knowledge	.411**	-	-
Product Experience	.088	.338**	-

* N = 129
** $p < .001$

Reliability Analysis

Internal consistency of major constructs used in the study was examined and the results are shown in Table 5.5. Cronbach's alpha for evaluation, confidence in evaluation, subjective knowledge, and product experience was .93, .94, .86, and .79 respectively, which is deemed acceptable (Nunnally, 1978). Therefore, all these measures were found to be reliable.

Although acceptable, reliability of product experience seems to be relatively low. Product experience in this study was measured using four items that assess search, usage, ownership, and purchase of the laptop computers; therefore, study results in relation to product experience must be interpreted with caution.

Table 5.5. Reliability Analysis of Measurement Items

	# of items	α
Target Brand Evaluation	5	.93
Evaluation Confidence	3	.94
Subjective Knowledge	5	.86
Product Experience	4	.79

* N = 129

Manipulation Checks

Since the target laptop computer is presented as being clearly superior to two other brands in the competitive ad condition, it was necessary to ascertain that subjects evaluate the target brand more favorably than the competitive brands. Results show that mean evaluation scores for the target brand and the competitive brands A and B are 7.7, 6.3, and 7.0, respectively (Table 5.6). Paired samples t-tests were performed for the three brands and, as shown in Table 5.7, subjects evaluated the target brand more positively than competitive brand A ($t = 8.69$, $p < .001$) and competitive brand B ($t = 4.22$, $p < .001$). The results indicate that product descriptions for the target and the competitive brands were successfully manipulated.

Table 5.6. Mean Evaluation Scores of Target and Competitive Brands

	Sample Size	Mean	Standard Deviation
Target	68	7.7	1.2
Competitive A	68	6.3	1.2
Competitive B	68	7.0	1.1

Table 5.7. Paired Samples t-test on Target and Competitive Brands

Paired Samples t-test	Mean Difference	Standard Deviation	t
1) Target and Competitive A	1.4	1.3	8.69**
2) Target and Competitive B	0.7	1.2	4.22**
3) Competitive A and Competitive B	0.7	1.1	5.54**

** $p \leq .001$, $df = 67$

For product knowledge variables (objective and subjective knowledge and product experience), high and low distinctions were made by splitting the sample into three groups (high, medium, and low) and eliminating the medium group. The mean score of the low objective knowledge group (4.9) is significantly lower than that of the high objective knowledge group (9.8), as shown in Table 5.8 (t = 17.45, $p < .001$). With respect to subjective knowledge and product experience, low subjective knowledge and product experience groups differed significantly from high subjective knowledge and product experience groups, as well.

Table 5.8. Differences between High and Low Knowledge Groups (Split into three groups)

	Sample Size	Mean	Standard Deviation	t
Low OK	46	4.9	1.3	17.45***
High OK	33	9.8	1.0	
Low SK	41	1.4	.4	17.13***
High SK	42	4.1	.8	
Low Experience	41	-.95	.1	34.37***
High Experience	44	.83	.2	

* $p < .05$, ** $p < .01$, *** $p < .001$

Emotional Effects

Subjects' emotional responses were assessed using Mehrabian and Russell's (1974) eighteen PAD (Pleasure-Arousal-Dominance) items. Researchers have shown that ad elicited emotions affect ad processing, such as attitude toward the ad and brand (Edell and Burke, 1987; Holbrook and Batra, 1987) and time

spent on ads (Olney, Holbrook, and Batra, 1991). It is likely that the competitive ad context in this study may elicit more arousal and dominance and less pleasure than the non-competitive ad context, resulting in different evaluations of the advertised brand in different ad contexts. Another explanation may be that low knowledge or less experienced subjects feel less pleased, less aroused, and more dominated by the ads, thus affecting their evaluations of the advertised brand. However, Tables 5.9 through 5.12 show that emotional states were not different in different ad contexts and knowledge levels except for one condition indicating that subjects feel more dominant in the competitive than in the non-competitive ad context. Due to the following results, emotional measures were excluded in hypothesis testing.

Table 5.9. Emotion Measures (Ad Context)

	Competitive			**Non-competitive**		
Emotion	N	Mean	SD	N	Mean	SD
Pleasure	68	4.2	1.1	61	4.0	1.1
Arousal	68	3.2	1.0	61	3.0	.9
Dominance*	68	4.3	.9	61	4.0	.7

* $p < .05$

Table 5.10. Emotion Measures (Objective Knowledge)

	Low OK			**High OK**		
Emotion	N	Mean	SD	N	Mean	SD
Pleasure	46	4.1	1.3	33	4.1	1.0
Arousal	46	3.1	1.0	33	3.2	1.1
Dominance	46	4.2	.9	33	4.2	.7

Table 5.11. Emotion Measures (Subjective Knowledge)

	Low SK			High SK		
Emotion	N	Mean	SD	N	Mean	SD
Pleasure	41	4.2	1.3	42	4.2	.9
Arousal	41	3.1	1.2	42	3.3	1.0
Dominance	41	4.2	.9	42	4.3	.9

Table 5.12. Emotion Measures (Product Experience)

	Low Experience			High Experience		
Emotion	N	Mean	SD	N	Mean	SD
Pleasure	41	4.0	1.1	44	4.4	1.0
Arousal	41	3.0	.9	44	3.0	1.0
Dominance	41	4.2	.8	44	4.3	.7

HYPOTHESIS TESTING

Recall

In order to test this hypotheses concerning recall performance, subjects' recall protocols were coded by two coders not aware of the purpose of the study. There was 91% agreement between the coders and disagreements were resolved through discussion.

H1 asserts that HK subjects will recall more target brand attributes than LK subjects in both competitive and non-competitive ad contexts. H1 was tested by examining the number of target attributes correctly recalled by high and low knowledge groups. Results of analyses are depicted in Table 5.13. As predicted by H1, the high objective knowledge group's score (M = 2.36) for correct recall of target attributes was significantly greater than that (M = 1.67) of the low objective knowledge group (t = 2.04, $p < .05$). The high subjective knowledge

group's score (2.07) was also greater than that (1.12) of the low subjective knowledge group (t = 3.12, $p < .01$). Finally, the high experience group's mean recall score (1.93) was greater than that (1.39) of the low experience group with a marginal significance (t = 1.80, $p = .10$). Overall, results indicate that high knowledge subjects are likely to recall more target attributes than low knowledge subjects, supporting H1.

Consistent with prior research (Alba, 1983; Philippe and Ngobo, 1999; Srull, 1983; Zinkhan and Muderrisoglu, 1985), the findings suggest that the sophisticated and well organized domain knowledge of high knowledge individuals enables them to comprehend and elaborate on the incoming information, resulting in higher recall performance. In contrast, low knowledge individuals may not be able to fully understand and integrate the product information due to a lack of relevant product knowledge. Since domain knowledge operating during the encoding of the information influences what information is learned and remembered (Chiesi et al., 1979), LK individuals are less likely to recall specific product attributes versus HK individuals.

Table 5.13. Correct Recall of Target Attributes by High and Low Knowledge Groups

	Sample Size	Mean	Standard Deviation	t
Low OK	46	1.67	1.4	2.04**
High OK	33	2.36	1.5	
Low SK	41	1.12	1.3	3.12***
High SK	42	2.07	1.3	
Low Experience	41	1.39	1.4	1.80*
High Experience	44	1.93	1.3	

* $p < .10$, ** $p < .05$, *** $p < .01$

H2 predicts that, for HK subjects, there will be no difference in H2a) target attribute recall and H2b) intrusions between non-competitive and competitive ad context. H2 was tested by comparing target attribute recall scores and intrusions between competitive and non-competitive ad contexts.

For correct recall of target attributes, independent samples t-tests reveal that high knowledge subjects recall target attributes equally well in both competitive and non-competitive ad contexts as shown in Table 5.14. Consistent results were obtained when objective knowledge, subjective knowledge, and product experience were considered. This indicates that subjects with high objective and subjective knowledge about and experience with laptop computers are able to recall target brand attributes well in both competitive and non-competitive ad contexts, thus supporting H2a.

Table 5.14. Correct Recall of Target Attributes by Ad Context (High Knowledge Groups)

		Sample Size	Mean	Standard Deviation	t
Objective Knowledge	Competitive	16	2.19	1.6	.63
	Non-competitive	17	2.53	1.4	
Subjective Knowledge	Competitive	20	1.90	1.3	.70
	Non-competitive	22	2.23	1.4	
Product Experience	Competitive	23	1.87	1.2	.31
	Non-competitive	21	2.00	1.4	

In testing H2b, a series of independent samples t-tests was conducted for recall intrusions in competitive and non-competitive ad contexts. Table 5.15 provides mean intrusion scores and t-test results. Contrary to the prediction by H2b, results show that competitive ad context produces significantly more intrusions than non-competitive ad context. Therefore, H2b is not confirmed.

Table 5.15. Intrusions in Target Attribute Recall by Ad Context (High Knowledge Groups)

		Sample Size	Mean	Standard Deviation	t
Objective Knowledge	Competitive	16	.44	.6	2.87**
	Non-competitive	17	.00	.0	
Subjective Knowledge	Competitive	20	.45	.8	2.56*
	Non-competitive	22	.00	.0	
Product Experience	Competitive	23	.30	.5	2.49*
	Non-competitive	21	.00	.0	

* $p < .05$, ** $p < .01$

For low knowledge subjects, this study predicts in H3 that H3a) target attribute recall and H3b) intrusions will be higher in the competitive ad context than in the non-competitive ad context.

As depicted in Table 5.16, low objective knowledge subjects are likely to recall more target attributes in the competitive ad context (M = 2.11) than in the non-competitive ad context (M = 1.37), which is marginally significant (t = 1.75, $p < .10$). Low subjective knowledge subjects also tend to recall more attributes in the competitive ad context (M = 1.37) than in the non-competitive ad context (M = .64) as indicated by t = 1.63, $p < .10$. This pattern of results, however, takes an opposite direction when it comes to product experience. In other words, subjects with low product experience are likely to recall less attributes in the competitive ad context (M = 1.76) than in the non-competitive context (M = 1.00), which is marginally significant (t = 1.77, $p < .10$). The results partially support H3a.

Table 5.16. Correct Recall of Target Attributes by Ad Context (Low Knowledge Groups)

		Sample Size	Mean	Standard Deviation	t
Objective Knowledge	Competitive	19	2.11	1.4	1.75*
	Non-competitive	27	1.37	1.3	
Subjective Knowledge	Competitive	27	1.37	1.5	1.63*
	Non-competitive	14	.64	.9	
Product Experience	Competitive	20	1.00	1.0	1.77*
	Non-competitive	21	1.76	1.6	

* $p < .10$

H3b was tested by performing t-tests on intrusions between competitive and non-competitive ad contexts for low knowledge groups. As shown in Table 5.17, subjects who have low objective and subjective knowledge about and low experience with laptop computers tend to elicit more intrusions in the competitive than in the non-competitive ad context, therefore, H3b is supported.

Table 5.17. Intrusions in Target Attribute Recall by Ad Context (Low Knowledge Groups)

		Sample Size	Mean	Standard Deviation	t
Objective Knowledge	Competitive	19	.53	.6	3.94**
	Non-competitive	27	.00	.0	
Subjective Knowledge	Competitive	27	.37	.6	2.18*
	Non-competitive	14	.00	.0	
Product Experience	Competitive	20	.30	.6	2.40*
	Non-competitive	21	.00	.0	

* $p < .05$, ** $p < .01$

The above results indicate that, for HK individuals, providing competitive product information via competitive ad context does not improve recall performance, yet improves recall performance of LK individuals as far as objective and subjective knowledge are concerned. It seems that competitive ad

context enables LK individuals to engage in relational processing leading to better recall performance, since recall is a function of both item-specific and relational processing (Malaviya et al., 1996). However, since HK individuals are able to engage in relational processing, regardless of whether competitive product information is provided by the ad context or not, their recall performance may not be affected by the ad context.

The opposite direction of recall performance by low experience subjects (Table 5.16) needs further discussion. One possible reason for this unexpected result seems to be related to the relatively low level of reliability of experience measures, although acceptable (alpha = .79). Product experience in this study was assessed using four items each indicating search, usage, purchase, and ownership of the product on different scales. Future research may need to provide more reliable measures of product related experience by using multiple items and conducting proper analyses to identify possible dimensionality or to ensure reliability (e.g., factor analysis).

Results indicate that competitive ad context increased brand and category intrusions for both HK (failing to support H2b) and LK individuals (supporting H3b) compared to non-competitive ad context. It seems that, due to their poorly organized knowledge structure, LK individuals are less likely to remember which attribute values are associated to the target brand in the competitive ad context. Therefore, LK individuals' amount of recall tends to be higher in the competitive ad context as a result of relational processing, yet at the same time there seem to be more intrusions in recall in the competitive ad context than in the non-

competitive ad context. Possible reasons for the insignificant result for HK individuals are provided in the Discussion section in chapter VI in more detail.

Recognition

As suggested by H4, it is predicted that there will be no difference in recognition of target brand attributes between HK and LK subjects. Consistent with this prediction, the mean score for target attribute recognition of the low objective knowledge group (M = 2.30) is not significantly smaller than that of the high objective knowledge group (M = 2.48, t = .80, n.s.). Likewise, as indicated in Table 5.18, this pattern of results are found between low (M = 2.36) and high (M = 2.59) subjective knowledge groups (t = 1.08, n.s.) and between low (M = 2.34) and high (M = 2.54) product experience groups (t = .94, n.s.). H4 is thus supported.

Table 5.18. Correct Recognition of Target Attributes by High and Low Knowledge Groups

	Sample Size	Mean	Standard Deviation	t
Low OK	46	2.30	.9	.80
High OK	33	2.48	1.0	
Low SK	41	2.36	.9	1.08
High SK	42	2.59	.9	
Low Experience	41	2.34	1.0	.94
High Experience	44	2.54	.9	

H5 predicts that confusions of recognition will be higher in the competitive ad context than in the non-competitive ad context because competitive ad context tends to lower item-specific processing of the target brand to a moderate level. Results in Table 5.19 show that subjects in the competitive ad context were more confused in target attribute recognition (M = 1.55) than those

in the non-competitive ad context (M = 1.16), t = 2.53, $p < .05$. Therefore, H5 is supported.

Table 5.19. Confusions in Target Attribute Recognition by Ad Context

	Sample Size	Mean	Standard Deviation	t
Competitive	68	1.55	.7	2.53*
Non-competitive	61	1.16	.9	

* $p < .05$

In sum, recognition results indicate that recognition reflects item-specific processing where subjects simply link what is learned and probe items given in a recognition test. That is, the knowledge structure which differentiates HK and LK individuals in terms of their ability to perform relation processing does not play a significant role in recognition. Since relational processing is hardly involved in recognition, there may be no difference in recognition performance between HK and LK individuals. The results were consistent with this assertion.

Results also suggest that competitive ad context increases recognition confusion because competitive ad context limits item-specific processing of the target brand to a modest level. However, when considering correct recognition, this study found that competitive ad context (M = 2.4) was not different from non-competitive ad context (M = 2.5), t = .06, n.s..

Therefore, it seems that recognition scores between competitive and non-competitive ad contexts are not different because recognition is a function of item-specific processing which is made possible in both ad contexts. However, it is likely that competitive ad context confines item-specific processing to the level

where recognition confusion is increased but correct recognition of the target brand is intact.

Cognitive Responses

In order to test this hypothesis, subjects' response protocols were scored by two coders including the researcher and another coder who is not aware of the purpose of the study. There was 90% agreement between the coders. Disagreements were resolved through discussion.

Response protocols were categorized into item-specific thoughts (i.e., target attribute thoughts (e.g., "Large space for memory, normal battery life") and simple evaluative thoughts (e.g., "I thought it was a nice computer")) and relational thoughts (i.e., comparison thoughts (e.g., "It seemed to stick out as the best out of the three laptops") and categorization thoughts (e.g., "Sounded like a standard, newer model laptop")). In line with previous studies (Maheswaran and Sternthal, 1990; Sujan, 1985), this study considers target attribute thoughts and comparison thoughts as high elaboration thoughts and simple evaluative thoughts and categorization thoughts as low elaboration thoughts.

H6 predicts that, in both competitive and non-competitive ad contexts, HK subjects will generate a greater amount of high elaboration thoughts (target attribute thoughts and comparison thoughts) than low elaboration thoughts (simple evaluative thoughts and categorization thoughts). Cognitive response scores for high objective knowledge, high subjective knowledge, and high product experience groups are presented in Tables 5.20, 5.22, 5.24, respectively. Separate paired samples t-tests were performed to examine whether there are significant

differences between the amounts of high and low elaboration thoughts elicited by high knowledge subjects. T-test results are presented in Tables 5.21, 5.23, 5.25. Findings indicate that high objective knowledge subjects are likely to elicit more target attribute thoughts (M = .42) than simple evaluation thoughts (M = .12), t = 2.54, $p < .05$. However, as shown in Table 5.21, there is no difference between the amounts of comparison thoughts and categorization thoughts (M_{diff} = .12, t = 1.27, n.s.). In a similar vein, high subjective knowledge subjects generate more target attribute thoughts (M = .43) than simple evaluative thoughts (M = .17), t = 2.31, $p < .05$. However, results in Table 5.23 show that there is no difference between the amounts of comparison thoughts and categorization thoughts produced by high subjective knowledge subjects (M_{diff} = .02, t = .29, n.s.). For high product experience subjects, there is no difference between the amount of high elaboration thoughts and low elaboration thoughts as indicated in Table 5.25. Based on the above results H6 is partially supported.

Table 5.20. Mean Cognitive Response Scores (High Objective Knowledge)

		Sample Size	Mean	Standard Deviation
Item-specific	Target attribute	33	.42	.5
	Simple evaluation	33	.12	.3
Relational	Comparison	33	.21	.4
	Categorization	33	.09	.2

Table 5.21. Paired Samples t-test on Cognitive Responses (High Objective Knowledge)

Paired Samples t-test	Mean Difference	Standard Deviation	t
1) Target attribute and Simple evaluation	.30	.6	2.54*
2) Comparison and Categorization	.12	.5	1.27

* $p < .05$, $df = 32$

Table 5.22. Mean Cognitive Response Scores (High Subjective Knowledge)

		Sample Size	Mean	Standard Deviation
Item-specific	Target attribute	42	.43	.5
	Simple evaluation	42	.17	.3
Relational	Comparison	42	.14	.3
	Categorization	42	.17	.3

Table 5.23. Paired Samples t-test on Cognitive Responses (High Subjective Knowledge)

Paired Samples t-test	Mean Difference	Standard Deviation	t
1) Target attribute and Simple evaluation	.26	.7	2.31*
2) Comparison and Categorization	.02	.5	.29

* $p < .05$, $df = 41$

Table 5.24. Mean Cognitive Response Scores (High Product Experience)

		Sample Size	Mean	Standard Deviation
Item-specific	Target attribute	44	.43	.5
	Simple evaluation	44	.25	.3
Relational	Comparison	44	.18	.3
	Categorization	44	.14	.3

Table 5.25. Paired Samples t-test on Cognitive Responses (High Product Experience)

Paired Samples t-test	Mean Difference	Standard Deviation	t
1) Target attribute and Simple evaluation	.18	.8	1.48
2) Comparison and Categorization	.05	.5	.57

$df = 43$

H7 holds that LK subjects will generate a greater amount of high elaboration thoughts (comparison thoughts and target attribute thoughts) in the competitive than in the non-competitive ad context. Independent-samples t-tests were conducted in order to determine if there are differences between the amounts

of high and low elaboration thoughts in different ad contexts. Results show that no significant differences are found in different ad contexts in terms of the amount of high and low elaboration thoughts. Results are depicted in Tables 5.26, 5.27, and 5.28. H7 is therefore not supported.

Table 5.26. Cognitive Responses of Target Brand by Ad Context (Low Objective Knowledge)

		Sample Size	Mean	Standard Deviation	t
Target Attribute	Competitive	16	.47	.5	1.50
	Non-competitive	17	.26	.4	
Simple Evaluation	Competitive	16	.21	.4	.37
	Non-competitive	17	.26	.4	
Comparison	Competitive	16	.21	.5	1.14
	Non-competitive	17	.07	.2	
Category	Competitive	16	.21	.4	1.35
	Non-competitive	17	.07	.2	

Table 5.27. Cognitive Responses of Target Brand by Ad Context (Low Subjective Knowledge)

		Sample Size	Mean	Standard Deviation	t
Target Attribute	Competitive	27	.37	.4	1.52
	Non-competitive	14	.14	.3	
Simple Evaluation	Competitive	27	.19	.3	.33
	Non-competitive	14	.14	.3	
Comparison	Competitive	27	.19	.4	.28
	Non-competitive	14	.14	.3	
Category	Competitive	27	.15	.3	.69
	Non-competitive	14	.07	.2	

Table 5.28. Cognitive Responses of Target Brand by Ad Context (Low Product Experience)

		Sample Size	Mean	Standard Deviation	t
Target Attribute	Competitive	20	.30	.4	.80
	Non-competitive	21	.19	.4	
Simple Evaluation	Competitive	20	.25	.4	.45
	Non-competitive	21	.19	.4	
Comparison	Competitive	20	.05	.2	.98
	Non-competitive	21	.14	.3	
Category	Competitive	20	.20	.4	.93
	Non-competitive	21	.10	.3	

To summarize, the study postulated in H6 that the enriched and well organized product knowledge of HK individuals enables them to elaborate on target brand features in relation to competitive brand information in the non-competitive ad context as well as in the competitive ad context. Therefore, across different ad contexts, HK individuals may well engage in item-specific and relational processing and will elicit more elaborative inferences (i.e., more target attribute and comparison thoughts than simple evaluation and categorization thoughts). Results suggest that HK subjects are likely to elaborate on specific attribute information rather than simply stating overall evaluation of the brand. That is, HK subjects tend to process target brand in a specificway by expanding upon attribute information. However, considering cognitive thoughts related to relational processing, the amount of comparison thoughts elicited by HK subjects was not different from that of categorization thoughts, in consistent with the prediction.

Analyses of cognitive responses made by LK subjects, in general, do not support our prediction (H7). That is, contrary to the prediction, the study found

that competitive ad context did not lead to more high elaboration thoughts (i.e., target attribute and comparison thoughts) than non-competitive ad context.

There seem to be several explanations for there being no suppor t for H7 and weak support for H6 in this study. One possibility may be related to the low level of motivation to elicit cognitive thoughts indicated by the low response rate. The other possibility includes the study procedure where the cognitive response measure was preceded by recall response causing subjects to perceive cognitive response elicitation redundant and unnecessary. We will return to this issue in more detail in chapter VI.

Evaluation

It is hypothesized in H8 that HK subjects will evaluate the target brand favorably in both competitive and non-competitive ad contexts. As presented in Table 5.29, results show that high knowledge subjects are likely to evaluate target brand similarly in both competitive and non-competitive ad contexts. Specifically, the mean evaluation score of high objective knowledge subjects in the competitive context (M = 8.1) is not significantly different from the mean score in the non-competitive ad context (M = 7.3), t = 1.86, n.s.. Similarly, for high subjective knowledge subjects, the mean evaluation score in the competitive ad context (M = 7.9) is not significantly different from the mean score in the non-competitive ad context (M = 7.3), t = 1.39, n.s.. The same pattern of results was found for high product experience subjects as shown in Table 5.29. The results indicate that high knowledge subjects' evaluation of the target brand is not influenced by the presence of competitive (relational) information from the

context. High knowledge subjects are able to evaluate the target brand consistently regardless of ad contexts because they have enough resources in their knowledge to evaluate the target brand constantly, with or without external relational information. H8 thus is confirmed.

Table 5.29. Evaluation of Target Brand by Ad Context (High Knowledge Groups)

		Sample Size	Mean	Standard Deviation	t
Objective Knowledge	Competitive	16	8.1	1.0	1.86
	Non-competitive	17	7.3	1.3	
Subjective Knowledge	Competitive	20	7.9	1.3	1.39
	Non-competitive	22	7.3	1.3	
Product Experience	Competitive	23	7.6	1.4	.44
	Non-competitive	21	7.4	1.2	

As presented by H9, the study predicts that LK subjects will evaluate the target brand more favorably in the competitive ad context than in the non-competitive ad context. H9 was tested by performing t-tests between mean scores of low knowledge subjects in competitive and non-competitive ad contexts. Consistent with the prediction, the mean evaluation score in the competitive ad context is greater than that in the non-competitive ad context. Specifically, as shown in Table 5.30, low objective knowledge subjects are likely to evaluate the target brand more favorably in the competitive ad context (M = 7.9) than in the non-competitive ad context (M = 6.5), where the mean difference is statistically significant (t = 4.50, $p < .001$). Low subjective knowledge subjects are also likely to evaluate the target brand more positively in the competitive ad context (M = 7.8) than in the non-competitive ad context (M = 6.5), t = 3.50, $p < .001$. Finally, in concert with the results, low product experience subjects are more favorable

toward the target brand in the competitive ad context (M = 7.5) than in the non-competitive ad context (M = 6.7), t = 2.31, $p < .05$. Therefore, H9 is confirmed.

The results suggest that competitive (relational) information serves as reference for low knowledge subjects to evaluate the target brand more properly than when competitive information is not provided. Low knowledge subjects do not have enough reference information to compare with the target brand when it is presented alone and, therefore, seem to evaluate it neutrally, resulting in lower evaluation scores in the non-competitive ad context versus the competitive ad context.

Table 5.30. Evaluation of Target Brand by Ad Context (Low Knowledge Groups)

		Sample Size	Mean	Standard Deviation	t
Objective Knowledge	Competitive	19	7.9	.8	4.50***
	Non-competitive	27	6.5	1.1	
Subjective Knowledge	Competitive	27	7.8	1.0	3.50***
	Non-competitive	14	6.5	1.2	
Product Experience	Competitive	20	7.5	1.1	2.31*
	Non-competitive	21	6.7	1.0	

* $p < .05$, ** $p < .01$, *** $p < .001$

The results provide an interesting finding that HK individuals evaluate the target brand invariantly in both competitive and non-competitive ad contexts whereas LK individuals are likely to evaluate the same brand more positively in the competitive than in non-competitive ad context. It seems that competitive ad context offers relational information so that LK individuals can elaborate on the target brand in relation to competitive brands leading to a proper appreciation of the brand. In contrast, competitive ad context does not influence HK individuals' evaluation because HK individuals are able to assess target brand information

consistently regardless of whether or not relational brand information is externally provided.

Confidence in Evaluation

A multiple regression analysis was performed in order to determine what types of product knowledge are related to confidence in evaluation. Regression results are provided in Table 5.31. Results indicate that product knowledge variables as a whole affect confidence in evaluation ($F_{(3, 124)} = 7.93$, $p < .001$). Results also suggest that subjective knowledge is the single most important variable which influences evaluation confidence as indicated by the t-ratio that is statistically significant ($t = 3.74$, $p < .001$).

Table 5.31. Multiple Linear Regression Analysis for Confidence in Evaluation

	Unstandardized Coefficients (B)	Standardized Coefficients (Beta)	*t*	*p*	F
(Constant)	2.64		6.17	.001	
Subjective Knowledge	**.41**	**.35**	**3.74**	**.001**	
Objective Knowledge	.02	.03	.42	.67	**7.93*** **
Product Experience	.11	.06	.74	.46	

$R = .40$, $R^2 = .16$, $p < .001$

In testing effects of different ad contexts on confidence in evaluation for high knowledge subjects (H10) and low knowledge subjects (H11), the subjects were divided based on their subjective knowledge. This decision was made based on the results shown in Table 5.31.

H10 predicts that HK subjects will feel confident in both competitive and non-competitive ad contexts. As predicted by H10, there is no significant difference between confidence scores in the competitive ad context (M = 4.6) and

in the non-competitive ad context (M = 4.8). Based on the result, H10 is supported (see Table 5.32 below).

Table 5.32. Confidence in Target Brand Evaluation by Ad Context (High Subjective Knowledge)

	Sample Size	Mean	Standard Deviation	t
Competitive	20	4.6	1.6	.55
Non-competitive	22	4.8	1.2	

H11 postulates that LK subjects will feel less confident in the non-competitive ad context than in the competitive ad context. A t-test was performed to determine whether there is significant difference between two ad contexts in terms of evaluation confidence (Table 5.33). For low subjective knowledge subjects, confidence scores between competitive ad context (M = 3.7) and non-competitive ad context (M = 3.0) did not significantly differ, t = 1.48, p = .14. Therefore, H11 is not supported, however, the direction is as predicted.

Table 5.33. Confidence in Target Brand Evaluation by Ad Context (Low Subjective Knowledge)

	Sample Size	Mean	Standard Deviation	t
Competitive	27	3.7	1.3	1.48
Non-competitive	14	3.0	1.2	

Findings indicate that individuals with high subjective knowledge feel uniformly confident in evaluation in both ad contexts since they believe that they are knowledgeable enough to evaluate the brand appropriately with or without competitive brand information. In this study, low subjective knowledge individuals seem to feel more confident when evaluating the target brand in the

presence than in the absence of competitive brand information. However, the difference was not statistically significant.

CHAPTER VI

DISCUSSION

SUMMARY AND DISCUSSION

Consumer product knowledge affects how consumers understand and organize product information, and eventually how they evaluate brands and what brands they purchase (Alba & Hutchinson, 1987). Understanding the differences in processing between high knowledge (HK) and low knowledge (LK) consumers is important because elaboration on incoming product information is largely determined by content and organization of relevant product information they already have, which in turn influences the quality of integrated, retrieved, and evaluated newly acquired product information.

The item-specific-relational processing framework suggests that the distinctiveness of the target brand information should be considered in relation to comparable information from other brands. This indicates that the combined presence of relational and item-specific processing is necessary to induce higher product memory and more favorable evaluation of advertising claims (Kent & Machleit, 1990; Meyers-Levy, 1991). However, in order to get the best results in terms of product memory and evaluations, consumers will need to have enough cognitive capacity enough to render both item-specific and relational processing. Consumer product knowledge is one of the most important indicators of cognitive capacity (Alba & Hutchinson, 1987; Brucks, 1985) and acknowledging that consumers differ in the cognitive capacity to process incoming product

information and that elaborative processing during encoding requires cognitive resources to render both types of processing. The current item-specifiϵ relational processing framework should incorporate the role of consumer knowledge in order to predict product memory and product evaluations more precisely.

Therefore, the goal of this research was to examine how HK and LK consumers differ in product memory, cognitive responses, product evaluations, and confidence in evaluation in competitive and non-competitive ad contexts.

The basic premise of the item-specifiϵ relational framework is that processing of target (item-specific) information can better be performed when processing of competitive (relational) information is accompanied than when it is not. Ad context where a target brand ad is placed plays an important role in consumer elaborating on target brand information. From the item-specific-relational perspective, the competitive ad context in which competitive brands as well as target brand are presented may render a readily occurrence of both item-specific and relational processing. In contrast, only item-specific processing may be readily accessible in the non-competitive ad context where target brand alone is presented (along with ads for different product categories). Seemingly, according to the item-specific-relational framework, other things being equal, memory, cognitive thoughts, evaluation, confidence in evaluation about target brand are better implemented when target and competitive brand information co-occurs (i.e., competitive ad context) versus when target brand information is presented alone (i.e., non-competitive ad context).

However, this research suggests that it depends on consumer product knowledge whether competitive ad context affects consumer processing of target brand positively or not. The study predicts that competitive ad context increases performance in terms of memory, cognitive elaboration, evaluation, and confidence in evaluation only when consumer product knowledge is low. That is, when consumers have high level of product knowledge, their performance is not influenced by ad context.

This section provides a summary and discussion of the findings from the study. A summary of hypothesis testing is presented in Table 6.1.

Table 6.1. Summary of Hypothesis Testing

Dependent Measure		Condition	Prediction	Remarks	Results
Recall	H1	Across ad contexts	HK > LK	Attributes	**Supported**
	H2a	For HK	Competitive = Non-competitive	Attributes	**Supported**
	H2b	For HK	Competitive = Non-competitive	Intrusions	**Not supported**
	H3a	For LK	Competitive > Non-competitive	Attributes	**Partially supported**
	H3b	For LK	Competitive > Non-competitive	Intrusions	**Supported**
Recognition	H4	Across ad contexts	HK = LK	Hits	**Supported**
	H5	Across knowledge	Competitive > Non-competitive	False alarms	**Supported**
Cognitive Responses	H6	For HK	Comparison and target attribute thoughts > Categorization and simple evaluative thoughts		**Partially supported**
	H7	For LK	Competitive > Non-competitive	High elaboration thoughts	**Not supported**
Evaluation	H8	For HK	Competitive = Non-competitive		**Supported**
	H9	For LK	Competitive > Non-competitive		**Supported**
Confidence	H10	For HK	Competitive = Non-competitive		**Supported**
	H11	For LK	Competitive > Non-competitive		**Not supported**

Recall

This study predicted that high knowledge subjects recall more attributes than low knowledge subjects (H1). It was found that subjects with high objective and subjective knowledge and high product experience recalled more target attributes than those with low knowledge. The results are in line with previous research (Alba, 1983; Anderson and Pichert, 1978; Maheswaran, 1994). High knowledge individuals are likely to have a greater amount of product information and better organized structure than low knowledge individuals. This may enable HK individuals to understand incoming information better and possibly lead to higher recall performance than LK individuals.

This study extends prior research on recall difference between HK and LK individuals by demonstrating that ad context affects recall performance of HK and LK subjects differently. Recall is a function of item-specific and relational processing and is best performed when both item-specific and relational processing are easily accessible (Malaviya et al., 1996). However, when ad context is considered in such a way that a target brand ad is presented in a competitive ad context (where both item-specific and relational processing are readily available) or in a non-competitive ad context (where only item-specific processing is made easily), recall of target attributes by HK and LK subjects will vary differently.

As predicted, the study found that HK subjects' recall performance was not different in the non-competitive ad context (item-specific information)

compared to competitive ad context (item-specific and relational information) because HK subjects have a great deal of product information (brands, models, subcategories, attributes) that serves as reference for relational processing in the non-competitive ad context (H2a). In contrast, LK subjects were likely to recall more attributes in the competitive ad context than in the non-competitive ad context, which was marginally significant when considering objective and subjective knowledge (H3a).

It has been noted that in a competitive ad context, the recall of a target brand's ad claims can be decreased by exposure to other brands in the same product category (Burke and Srull, 1988; Keller, 1987, 1991; Kent, 1997; Kent and Allen, 1994). Research suggests that the highly cluttered and competitive nature of ads can be detrimental to message recall and effectiveness. However, recent studies propose various factors in increasing target ad recall in a competitive ad context (Jewell and Unnava, 2003; Kent, 1997; Unnava and Sirdeshmukh, 1994). These researchers suggest that distinctiveness of target ads is the key factor and distinctive ad memory traces may resist memory interference making them easier to recall. This implies that ad memory traces can be recalled better in a competitive ad context because target brand information can become distinctive in the presence of competing brand information, leading to a higher recall performance.

This study extends prior research on the positive effect of competitive ad contexts on recall by demonstrating that this effect does not always happen if consumer product knowledge is considered. That is, providing competitive brand

information (i.e., competitive ad context) is likely to improve recall performance of LK individuals but not likely to affect HK individuals' recall.

One indicator of relational processing in recall is intrusions from category or competitive brands. It was hypothesized that intrusions between competitive and non-competitive ad context will not be different for HK subjects (H2b) whereas, for LK subjects, intrusions will be higher in the competitive than in the non-competitive ad context (H3b). Contrary to the prediction, HK subjects' intrusions were higher in the competitive ad context than in the non-competitive ad context. As hypothesized, however, LK subjects produced more intrusions in the competitive ad context than in the non-competitive ad context. This indicates that LK subjects do not have information on competitive brands and category enough to intrude in target attribute recall in the non-competitive ad context.

One reason for the insignificant results of HK subjects is that category and brand intrusions were not properly identified in this study. In prior research, intrusions are defined as recalled attributes that are typical for the category (category intrusions), or that are mentioned in the competitive brands (brand intrusions) but are not mentioned in the target brand (Malaviya et al., 1996). However, in this study, attributes mentioned in the target brand are typical for the laptop category (therefore, there is little possibility for category intrusions to occur) and they are also mentioned for the competitive brands but are only different in terms of attribute value (e.g., 80 GB hard memory for the target brand and 50 GB and 60 GB memory for two competitive brands). That is, if a subject recalls 60 GB memory for the target brand in the competitive ad context, it is

coded as intrusion and when a subject recalls 60 GB for the target brand in the non-competitive ad context, it is coded as false recall. However, we are not sure if false recall is due to category intrusion or not.

Based on the assumption that false recall in the non-competitive ad context is due to category intrusion, we re-analyzed the intrusion data. Results show that, for HK subjects, intrusions between competitive ad context and non-competitive ad context are not significantly different whereas, for LK subjects, intrusions are significantly higher in the competitive than non-competitive ad context. This suggests that HK subjects perform relational processing in the non-competitive ad context as well as in the competitive ad context. However, LK subjects are less likely to perform relational processing in the non-competitive ad context than in the competitive ad context.

Recognition

Item-specifiϵ relational processing framework suggests that attribute recognition is largely affected by item-specific processing (Einstein and Hunt, 1980; Kent and Machleit, 1990; Meyers-Levy, 1991) because recognition test requires subjects only to discriminate attributes which item-specific processing can facilitate. Therefore, it may be that correct recognition relies on the level of item-specific processing.

Consistent with prior studies (Alba et al., 1981; Long and Prat, 2002), the study found that correction recognitions between HK and LK subjects are not different (H4). The advantage in recall performance by HK subjects is diminished when the task is recognition. This suggests that recognition test depends on item-

specific processing which is relatively easy for both HK and LK individuals to perform. In addition, LK consumers are more likely to process each product attribute independently due to their lack of domain knowledge and a loosely organized knowledge structure. In contrast, HK consumers may be able to organize incoming product attribute information into their knowledge and tend to elicit richer inferences or concentrate on the gist of product information (Alba and Hutchinson, 1987).

This study found that correct recognitions in the competitive ad context and non-competitive ad context were not different. However, other researchers have suggested that recognition performance can be affected by competitive ad context such that recognition confusion (i.e., identifying attributes not described for the target brand but falsely recognizing them as mentioned in the target ad) is heightened in the competitive ad context than in the non-competitive ad context (Law, 2002; Malaviya et al., 1999). H5 was proposed to test this and, as predicted, results found that recognition confusion was higher in the competitive ad context ($M = 1.55$) than in the non-competitive ad context ($M = 1.16$).

In summary, it seems that correct recognitions between HK and LK subjects are not different because recognition tests areeasy to perform and correct recognitions between competitive and non-competitive ad contexts are not different because recognition is a function of item-specific processing which is made possible in both ad contexts. However, it is also likely that competitive ad context increases recognition confusion because competitive ad context limits

item-specific processing of the target brand to a modest level where recognition confusion is increased but correct recognition of the target brand is not affected.

Cognitive Responses

The presence of different types of elaborative processing has been evidenced by examining cognitive thoughts elicited by subjects (Wright, 1980). Item-specific and relational processing can be indicated by different types of cognitive responses such that item specific processing generates target attribute thoughts and simple evaluative thoughts, whereas relational processing is indicated by brand comparison thoughts and categorization thoughts. However, the degree of elaboration depends on consumer product knowledge. In other words, HK individuals are able to generate more high elaborative thoughts (target attribute thoughts and comparison thoughts) than low elaboration thoughts (simple evaluation thoughts and categorization thoughts) with the opposite occurring for LK individuals.

The study predicted that HK subjects will generate more high elaboration thoughts than low elaboration thoughts in both competitive and non-competitive ad contexts (H6), whereas LK subjects will generate more high elaboration thoughts only in the competitive ad context (H7). Results found that HK subjects generate more target attribute thoughts than simple evaluative thoughts but similar amounts of comparison and categorization thoughts. This partially supported H6. These results suggest that the enriched domain product knowledge and the well organized structure enable HK subjects to elaborate on specific target brand attributes rather than simply evaluate it as good or bad. The results are in line with

prior research which found that HK subjects generated more attribute oriented thoughts (Celsi and Olson, 1988; Maheswaran and Sternthal, 1990).

Contrary to the prediction, however, amounts of comparison thoughts and categorization thoughts generated by HK subjects were no different. Analysis of cognitive responses made by LK subjects revealed that LK subjects did not generate more high elaboration thoughts in the competitive ad context than in the non-competitive thoughts, which does not support H7.

It seems that subjects were not highly involved in generating cognitive thoughts. In Maheswaran and Sternthal's (1990) study, means for total number of thoughts elicited in the attributes only condition were 6.31 for HK subjects and 3.82 for LK subjects. This study, however, observed that the number of total thoughts generated is less than 1.0 for both HK and LK subjects as shown in Table 6.2. The low response rates may be responsible for failing to find a statistical significance.

Table 6.2. Means for Total Thoughts by High and Low Knowledge Groups

	Sample Size	Mean	Standard Deviation	t
Low OK	46	.84	.6	.00
High OK	33	.84	.6	
Low SK	41	.75	.6	1.17
High SK	42	.90	.5	
Low Experience	41	.70	.6	2.30*
High Experience	44	1.00	.4	

* $p < .05$

There may be at least two reasons for the low response rates. First, subjects in general do not seem to be highly motivated to process ad messages. Simply asking them to list thoughts after looking at laptop ads is not likely to increase subjects' involvement in eliciting their thoughts. Another reason is that,

in this study, cognitive response test followed recall test. This seemed to make subjects feel that both tests are similar to each other and are therefore redundant. This may have lowered their intent to generate cognitive thoughts.

Evaluation

Although the co-occurrence of both types of processing at encoding is likely to lead to better product evaluation (Malaviya et al., 1996; Meyers-Levy and Malaviya, 1999), the effect may differ for HK and LK individuals due to their differences in ability to process incoming information and retrieve it from memory for product evaluations in different ad contexts.

This study found that HK subjects evaluated the target brand favorably in both competitive and non-competitive ad contexts (H8) whereas LK subjects evaluated the target brand more favorably in the competitive ad context than in the non-competitive ad context (H9).

Since HK subjects have sophisticated product information and well-organized knowledge structure in memory, they are able to make a refined evaluation of the target brand, regardless of whether competitive brand information is explicitly provided or not. That is, explicitly providing competitive brand information does not affect HK subjects' evaluation because the target brand ads in both competitive and non-competitive ad contexts feature the same attribute information and HK subjects can assess target brand information more objectively and consistently with or without external providing of competitive brand information.

This study suggests that, for LK subjects, the target brand will benefit more from competitive ad context than from non-competitive ad context. Presence of competitive brand information increases LK subjects' ability to evaluate target brand information by serving as relational information for them to make comparisons between target and competitive brands. However, in the non-competitive ad context, LK subjects may not be able to assess and elaborate on target brand information appropriately due to a lack of product information in knowledge, resulting in a less favorable evaluation of the target brand.

Confidence in Evaluation

The results from the study demonstrate that high subjective knowledge subjects exhibit an equal level of confidence in evaluation in both competitive and non-competitive ad context (H10). This indicates that self-assessed knowledge about their ability to evaluate and elaborate on the target brand makes individuals feel equally confident in the absence of competitive brand information as in the presence of competing brand information.

The study predicted that low subjective knowledge subjects feel more confident in the competitive than in the non-competitive ad context (H11). Results showed that confidence in the competitive ad context (M = 3.7) is higher than that in the non-competitive ad context (M = 3.0), failing to reach a significant level (p = .14). H11 was not supported, but it was directionally as predicted. It may be that non-competitive ad context makes it difficult for LK subjects to evaluate the target brand appropriately because evaluation is made based on insufficient resources, causing them to feel less confident. However, in the competitive ad

context, LK subjects may be able to process target brand information in greater detail resulting in seemingly higher confidence.

SYNTHESIS

Prior research has posited that both types of elaborative processing at encoding – item-specific and relational –enhance message retrieval and judgments (Hunt and Einstein, 1981; Kent and Machleit, 1990; Malaviya et al., 1996). This assertion recognizes qualitative differences in the types of processing and their contribution to persuasive processing in such a way that the co-occurrence of certain levels of both types of processing produces increased message retrieval and more favorable judgments.

However, item specific-relational processing framework has never been previously examined in consideration of consumer product knowledge. This study suggests that consumer product knowledge should be regarded as an important factor for delineating the influence of the types of elaborative processing on product memory and product evaluations. Viewed from the item specific relational processing perspective, different ad contexts (i.e., competitive and non-competitive ad contexts) provide either item-specific processing or both item-specific and relational processing. The findings from this study provide some important insights into the role of product knowledge in processing product information in different ad contexts.

Results suggest that product knowledge serves as a resource for elaborating on target brand information. HK individuals are able to elaborate on target brand messages regardless of whether competitive(relational) brand

information is explicitly presented or not. They retrieve the same amount of target attributes, elicit high elaboration thoughts (target attribute thoughts), evaluate the target brand favorably, and feel confident in evaluation in both competitive and non-competitive ad contexts. In contrast, LK individuals recall less target attributes, evaluate the target brand less favorably, and feel less confident in evaluation in the non-competitive than the competitive ad context. That is, a competitive ad context (where both item-specific and relational processing are readily available) could benefit LK individuals but not HK individuals.

How can these results be explained? Prior research on interference effects (e.g., Burke and Srull, 1988) of memory in competitive ad context cannot explain the results. According to interference effects, recall performance in competitive ad context is worse than that in the non-competitive ad context because similar items in the competitive ad context will interfere with recall of target attributes. This leads to inferior recall in competitive ad context, which is the opposite of the findings from this study. Other researchers (e.g., Unnava and Sirdeshmukh, 1994) have demonstrated that competitive ad context can be beneficial for or at least not harm recall performance. They, however, do not explain why competitive ad context sometimes increases processing performance and sometimes does not.

The item-specific-relational processing framework (Einstein & Hunt, 1980; Hunt & Einstein, 1981) alone cannot explain processing differences between HK and LK individuals in the competitive and non-competitive ad context; in our study, all the subjects in both competitive and non-competitive ad contexts were instructed to commit to relational processing (by asking them to try

to compare the target brand with any brand available to them) as well as item-specific processing. Therefore, in a strict sense, the item-specifiϵ relational processing framework should predict no difference in performance between competitive and non-competitive ad contexts because both item-specific and relational processing are assured for all the subjects.

The role of product knowledge within the item-specific-relational processing framework will provide a viable explanation for the findings. HK individuals' performances in the competitive and non-competitive ad contexts are no different because HK individuals have sophisticated and well-organized (relational) product information enough to render relational processing in the non-competitive ad context leading to as high performance as in the competitive ad context. LK individuals perform inferior with respect to product memory and evaluations in the non-competitive ad context even though they are encouraged to process the target brand in relation to competing brand information, because they do not have much of competitive (relational) brand information to elaborate on. In contrast, competitive ad context provides hands-on information on target and competitive brands so that LK individuals can perform both item-specific and relational processing possibly leading to better performance.

This study conceptualized product knowledge in terms of objective and subjective knowledge and product experience. Some researchers have suggested that objective knowledge is related to product information whereas subjective knowledge is an indicator of both product experience and stored product information. In contrast, others have viewed subjective knowledge as a proxy for

objective knowledge. Studies have also found a wide range of correlations between different knowledge constructs such as objective and subjective knowledge and product experience. Likewise, product knowledge is multidimensional in nature and there is still no agreement among researchers on how to conceptualize different knowledge components and how they are related to each other.

Part of the reason for this disagreement may come from different conceptualizations of subjective knowledge among researchers. As discussed above, subjective knowledge has been viewed as an indicator of either objective knowledge or product experience. However, it seems that subjective knowledge is perceptions of how much people know about a product class based on both objective knowledge and product experience. In addition, subjective knowledge may also reflect self perception. That is, even though a person knows a lot about and has much experience with a product class, he may perceive himself as being not as knowledgeable as others. Therefore, subjective knowledge can be viewed as consisting of objective knowledge, product experience, and self perception.

In this conceptualization, subjective knowledge is related with objective knowledge and product experience, which is consistent with the findings from this study. Objective knowledge and product experience do not necessarily correlate with each other. For example, someone may be knowledgeable about digital cameras (e.g., as a result of searching for product information for future purchase or out of curiosity) but he has not used digital cameras. This conceptualization may also explain why prior research has sometimes found little relation between

objective and subjective knowledge and a high relation between them at other times. In the case of low correlation between objective and subjective knowledge, product experience (and possibly self perception) may be the key determinant of subjective knowledge. Meanwhile, in the case of high correlation between objective and subjective knowledge, objective knowledge (and possibly self perception) may become the most influential component of subjective knowledge. This study is not aimed for delineating relationships among different knowledge constructs. However, future research may be required to examine the conceptualized relationship and its effects on product memory and evaluation.

As noted by Malaviya et al. (1996), the utilization of multiple measures makes it possible to rule out alternative explanations as viable accounts for the findings of this study. For example, the different outcomes in memory between competitive and non-competitive ad contexts can be predicted in terms of the competitive interference construct (e.g., Burke and Srull, 1988). However, it may not explain other outcomes such as evaluation that reflect the operation of item-specific and relational processing. In this study, recall, recognition, evaluation, and part of cognitive responses and confidence measures go together to evidence the presence of item-specific and relational processing and their different manifestations by HK and LK individuals, depending on ad contexts.

To summarize, this study extends previous research on item-specific-relational framework in consideration of competitive advertising context by demonstrating that LK individuals lacking in relational information can perform better in product memory and evaluation if appropriately provided with

competitive brand information (e.g., competitive ad context, comparative ad format).

When and why competitive is ad context beneficial? The findings from this study line up with prior research that competitive ad context is sometimes beneficial (Jewell and Unnava, 2003; Kent, 1997; Unnava and Sirdeshmukh, 1994). This study also adds to the growing body of literature on competitive ad context by illustrating that its positive effect is not manifested in a uniform manner for all consumers and that product knowledge is a possible factor which guides its valence. The study suggests that competitive ad context is beneficial because it present item-specific and relational processing opportunities and it is beneficial when individuals are not knowledgeable and are in need of competitive product information.

In addition, this study confirms to the assessibility-diagnosticy framework in memory based processing (Feldman and Lynch, 1988; Lynch, Marmorstein, and Weigold, 1988). This framework suggests that the likelihood of using any information about product in product decisions is a function of the accessibility of the target product information in memory and the diagnosticitiy of the target and of alternative product information. As shown in Table 5.16, LK subjects' correct recall of target product information tends to be higher in the competitive than non-competitive ad context. Their evaluation of the target brand was also higher in the competitive than non-competitive ad context indicating a positive correlation between information accessibility and evaluation.

With respect to the recall-attitude relationship, researchers have also demonstrated that the diagnosticity of recalled information in product evaluation is more critical than quantity (accessibility) of attributes recalled (Chattopadhyay and Alba, 1988; Kisielius and Sternthal, 1986; Lynch, Marmorstein, and Weigold, 1988). In order to test the relationship between diagnosticity of attributes and evaluation, regression analysis was conducted for the competitive ad context with the mean score of diagnostic attributes recalled (defined as recall of target brand attributes which are superior or inferior to competitive brand attributes) as the independent variable and target brand evaluation as the dependent variable. The result is presented in Table 6.3. The result suggests that recalled diagnostic attributes influences target brand evaluation as indicated by the F-ratio, which is statistically significant ($F_{(1, 66)} = 6.84$, $p < .05$).

Table 6.3. Simple Regression Analysis for Evaluation

	Unstandardized Coefficients (B)	Standardized Coefficients (Beta)	*t*	*p*	F
(Constant)	7.26		33.91	.001	
Recalled diagnostic attributes	.32	.31	2.61	.011	**6.84***

$R = .31$, $R^2 = .09$, $p < .05$

IMPLICATIONS

The study contributes to the existing theory and marketing communication practice in several ways. First, it provides empirical evidence for the effect of consumer knowledge in activating item-specific and relational processing for product memory and evaluations. This suggests that although both types of processing are necessary to increase product memory and favorable evaluations, in situations where relational processing is lacking, consumer knowledge serves

as an important source factor. In this study, simply encouraging LK individuals to elaborate on the target brand in comparison with competitive brands did not help improve their processing performance in terms of recall and evaluation. The findings suggest a potential advantage in seeking a segmentation strategy by developing different brand communication messages for different consumer segments with respect to product knowledge. That is, advertisers may benefit more by customizing ad messages tailored for different groups based on their knowledge levels. For example, by providing competitive brand or category information, low knowledge consumers' memory and evaluation of the target brand can be improved. One way to achieve this is to develop comparative messages for LK consumers so that they are more able to elaborate on the target brand and eventually accomplish better product memory and evaluation. Maheswaran et al. (1996) demonstrated thatLK consumers evaluate the target brand more favorably in a comparison format than in a non-comparison format.

Second, findings from the study provide valuable insights for making important decisions in current advertising environments. For example, when consumers are knowledgeable about the product category of interest, embedding the target ad in a competitive ad context or in a non-competitive context may not make a difference in target product memory and evaluations. However, for LK consumers, marketers may need to carefully consider ad environments. That is, if the target brand is offering more favorable features than competitive brands, it is best to present the target ad in a competitive ad context. This suggests that sometimes competitive ad context is beneficial if some conditions are met. Prior

research has shown that competitive ad context is harmful for target ads due to interference from competing brands. However, according to the item-specific-relational framework, competitive ad context could work favorably for marketers because it provides information to facilitate both relational and item-specific processing, which will eventually lead to better product judgments. This assertion is in line with structural alignment theory (Markman, 1998; Markman and Gentner, 1993a, 1993b) which suggests that alignable attributes are more memorable and favorable because alignable attributes are features whose values can be evaluated in the presence of comparable values in the same dimension. It is, therefore, easy to process alignable attributes and to find distinctiveness of their values.

Another way is to utilize editorial environments or relevant programs from which LK consumers can obtain relational product information for the target brand. For example, a new laptop ad can be inserted in or near the section or articles about new technology in a consumer magazine in order that LK consumers can be exposed to background (relational) information about the category or competitive brands. By elaborating on both target message (item-specific processing) and related product information (relational processing), LK consumers will be able to appreciate distinctive features of the target brand thereby establishing better memory and more accurate evaluation of the brand.

LIMITATIONS AND FUTURE RESEARCH

This study contributes to our understanding of how individuals with high and low product knowledge elaborate on product information in different ad contexts. However, as with any research, this study has some limitations which suggest potential avenues for future research.

Varying Levels of Competition

In this study, the level of competitive ad context was manipulated with two levels; no competitive ad versus two competitive ads. This decision was made following previous studies on item-specific and relational processing (Malaviya, Meyers-Levy, and Sternthal, 1999) and competitive interference (Kent and Allen, 1994). Some studies employing varying levels of competitive ads, however, suggest that increasing level of competition is detrimental to memory and evaluation of the target brand (Burke and Srull, 1988; Keller, 1987). For example, Burke and Srull (1988) observed that recall of ad claims decreased as the number of competitive ads increased from zero to three. Therefore, it may be possible that the increasing competition beyond a certain level will affect memory and evaluation of both LK and HK individuals negatively. Future research with varying levels of competition may provide us with support for this assertion.

External Validity

Laptop computers were used as a target product category in this study. Based on pretests, laptop computers were selected for use in the study. The sample in this study was employed from undergraduate students. It seems reasonable in the context of this study to investigate proposed hypotheses using

laptop computers with a student sample because the product category was the best to meet the experimental criteria (i.e., variance in product knowledge, relevance for the student sample). Will other product categories provide the same results? Will the results be generalizable to the general population? It is worthwhile to replicate the study with other product categories and different samples in order to increase external validity.

Low Level of Cognitive Response

As discussed before, this study did not find significant differences in cognitive responses by LK subjects in different ad contexts. We speculate that the low response rate concerning cognitive thoughts may be due to 1) low motivation and 2) survey procedure. First, it seems that subjects were not highly motivated to elicit detailed thoughts that went through their mind while reading the stimulus ads. In this study, most subjects tended to record the information depicted in the messages. Second, this low response rate is also related to the survey procedure employed in this study. The study asked subjects simply to record any thoughts that occurred in their mind while reading through the stimulus ads. Furthermore, the cognitive response test was preceded by a recall test, which might have caused confusion (i.e., both tests ask them to do the same thing) and lowered response tendency. Future research may need to find ways to increase the likelihood that subjects record any elicited thoughts and not just the information presented in the ads. For example, a study can ask subjects to describe the target brand to someone (e.g., friend or family) who is interested in purchasing the product.

Clear Operationalization of Key Constructs

As noted, some of the variables were not clearly defined in this study. Brand and category intrusions in recall were defined in prior studies as recalled attributes that are mentioned in the competitive brands or that are typical for the category but are not mentioned for the target brand. However, applying this operationalization in this study was not appropriate because it is not possible in this study to tell whether intrusions occur due to relational processing or they simply reflect incorrect recall. Future research may need to clearly define key constructs so that underlying processing can be identified properly.

Controlling the Type I Error

In this study, each of the eleven hypotheses was evaluated with a single mean difference test. It may be that the chance of a Type I error goes up by performing multiple mean difference tests. That is, the chance of incorrectly declaring an effect to be true increases, although in fact the effect is not true.

One way to control the overall Type I error rate is to adjust the alpha level of each individual test downwards using the Bonferroni correction. Since customarily the alpha level is set at 0.05 and there are eleven tests, the alpha level for each test would be 0.05/11. In general, the Bonferroni method is applied to control the error rate in cases where multiple tests are conducted in a single study. In this study, however, some dependent variables (e.g., recall, cognitive response, evaluation) are correlated. In testing mean differences in recall (H3), cognitive responses (H7), evaluation (H9) of LK subjects, knowing the outcome of a single test of a difference between ad contexts on a single variable (e, .g., recall) would

imply the outcome of the other tests on the other outcome variables (e.g., cognitive responses, evaluation). That is, these tests are not independent. Therefore, the usual Bonferroni correction would be too conservative.

However, acknowledging that there is a possible increase in Type I error in this study, future research will carefully consider controlling the Type I error in testing hypotheses. For example, in testing the role of product knowledge in evaluation in different ad contexts, one can conduct an ANOVA and examine the interaction effect (knowledge X ad context) instead of running two separate t-tests for high and low knowledge subjects.

While remedying these limitations, further endeavor needs to be invested to explore important implications from the findings in this study. First, product information can be divided into intrinsic (or functional) and extrinsic (or nonfunctional) attributes (Olson, 1977; Rao and Monroe, 1988). An ad in a typical situation may feature product information in terms of intrinsic (e.g., processing speed, screen size, memory capacity) and extrinsic attributes (e.g., warranty, price, design). In general, HK and LK consumers differentially focus on different types of attributes. More specifically, HK consumers are likely to rely more on intrinsic attributes of the target brand while LK consumers tend to perceive extrinsic attributes as more important and diagnostic in product evaluations and purchase decisions. It appears that item-specific and relational processing of incoming ad messages may exhibit different outcomes for HK and LK consumers due to their differences in message processing strategies. For example, HK consumers may focus on intrinsic features such as processing speed

and memory capacity of a laptop computer in an ad and find if the target brand is offering superiority in those features in relation to competing brands. In contrast, LK consumers will rely more on extrinsic attributes such as price and warranty and make comparisons with competitive brands to find distinctiveness of the target brand.

Second, there are important moderating factors other than product knowledge which may affect consumer processing of information in ads including enduring and situational involvement, need for cognition, processing goal, to name a few. For example, consumers who are highly involved with the product will likely elaborate on the target and competitive product ads by paying attention to intrinsic product features. In contrast, low involvement consumers may be more focused on peripheral cues (e.g., country of origin, warranty, design of the product) or benefits in evaluating the product. Future studies can manipulate the type of relational information and examine processing differences between high and low involvement consumers.

Third, future research may possibly expand the findings from this study to a new product adoption situation. Elaborating on a really new product is limited because it may not allow an appropriate level of relational processing. However, by providing information about a closely related product category, marketers may help consumers understand and evaluate the new product category more properly.

Fourth, this study defined product knowledge in terms of objective and subjective knowledge and product experience and tested hypotheses separately for each knowledge construct. Admitting that different knowledge constructs are

related differently to outcome measures (e.g., objective knowledge and product memory; subjective knowledge and evaluation confidence), future research may endeavor in examining relationships among the different knowledge constructs and their effects on various outcomes.

Appendix A: STUDY INSTRUCTION

Instruction for Competitive Ad Context

Thank you for participating in the study.

Several well-known manufacturers are planning to introduce new products and are interested in your opinions about them. In the following pages, you will find four ads for these new products including one PCS phone and three laptop computers. Each ad contains a model name, a headline, and a body of text describing product features.

Your task is to examine the product information presented in the ads and then answer the subsequent questions.

Please carefully read each ad at your own pace. While reading through thead s, please consider each advertised brand in relation to available alternative or competing brands in the same category in order to better understand the advertised brand.

Instruction for Non-Competitive Ad Context

Thank you for participating in the study.

Several well-known manufacturers are planning to introduce new products and are interested in your opinions about them. In the following pages, you will find four ads for these new products including PCS phone, vacuum cleaner, laser printer, and laptop computer. Each ad contains a model name, a headline, and a body of text describing product features.

Your task is to examine the product information presented in the ads and then answer the subsequent questions.

Please carefully read each ad at your own pace. While reading through thead s, please consider each advertised brand in relation to available alternative or competing brands in the same category in order to better understand the advertised brand.

Appendix B: STIMULUS ADS

Stimulus Advertisements for Competitive Ad Context

Filler Ad 1

SCP-4900 PCS phone

Keep up with business on the go using the SCP-4900 PCS phone.

- 1.7-inch full-color display
- high-quality speaker phone for conference calls
- WAP 2.0 web browser, PC USB interface
- JAVA enabled location service
- Call screening like on your answering machine
- Ringers and graphics personalization
- Voice-activated dialing, TTY compatibility

Call (866) 561-0088 or visit our website at www.scp_pcs.com.

SCP-4900

Changing your wireless world

Competitor Ad 1

S450 Laptop Computer

The company's on a roll with a new and refreshed laptop

- Intel Pentium IV processor up to 2.0GHz
- Generous 512 MB DDR RAM (expandable to 1.0 GB)
- Free 60 GB Ultra hard drive
- Battery life of up to 3 hours
- Weighs 6.2 lbs with full equipment
- SXGA+ 16” TFT display
- 64 MB DDR video memory for a full control of images
- DVD-ROM/CD-RW combo drive
- Integrated wireless LAN

For more information, visit at www.S450.com.

S450

Competitor Ad 2

DSC-T2 Laptop Computer

Introducing the new **DSC-T2**. You'll love it.

- Intel Pentium IV processor 2.0GHz with Hyper-Threading technology
- 512 MB RAM for multitasking power (expandable to 1.0 GB)
- 50 GB EIDE hard drive
- Battery life of up to 4 hours with quickly rechargeable lithium-ion battery
- Weighs only 6.0 lbs
- 15.1" TFT display
- 64 MB DDR video memory supports clear and colorful images on your screen
- DVD-ROM/CD-RW combo drive
- Integrated wireless LAN

Visit www.DSC-T2.com for more information.

DSC-T2

Target Ad

GT1500 Laptop Computer

The all new **GT1500.** It's all about performance and satisfaction.

- Intel Pentium IV processor up to 2.8GHz featuring Hyper-Threading technology
- Generous 1.0GB RAM (expandable to 2.0 GB)
- Roomy 80 GB hard drive
- Battery life of up to 5 hours with high capacity lithium-ion battery
- 6.5 lbs, fully configured
- Brilliant 15.1" TFT widescreen display
- 64 MB DDR video memory, higher resolution and more colors for your graphics
- DVD-ROM/CD-RW combo drive
- Integrated wireless LAN

Buy direct at 1-800- laptop1 or visit our site today!
www.GT1500.com

GT1500

Stimulus Advertisements for Non-Competitive Ad Context

Filler Ad 1

SCP-4900 PCS phone

Keep up with business on the go using the SCP-4900 PCS phone.

- 1.7-inch full-color display
- high-quality speaker phone for conference calls
- WAP 2.0 web browser, PC USB interface
- JAVA enabled location service
- Call screening like on your answering machine
- Ringers and graphics personalization
- Voice-activated dialing, TTY compatibility

Call (866) 561-0088 or visit our website at www.scp_pcs.com.

SCP-4900

Changing your wireless world

Filler Ad 2

S450 vacuum cleaner

With **S450** vacuum cleaner, your floors will be cleaned in no time.

- Dual edge groomers
- 20-foot power cord
- Multiple height adjustment
- Automatic power adjustment
- Comes with a full 1-year home-use warranty
- Ultra quiet motors
- Triple Filter System traps over 99% of fine dust and pollen particles
- 15-inch cleaning path

Visit www.S450.com/cleaner/ for more information.

S450

Cutting down on cleaning time

Filler Ad 3

DSC-T2 Laser Printer

Add speed and razor-sharp images to your business and personal output

- Print speed up to 20 ppm
- 1200 Image Quality; 600X600 dpi
- Features a 200MHz processor and 16MB of memory (expandable up to 144MB)
- Handles most media: transparencies, cardstock, paper
- Standard 1-Year Advanced Exchange Service and 24X7 toll-free tech support

For more details, visit DSC-T2.com or call 1-800-222-easy.

DSC-T2

Target Ad

GT1500 Laptop Computer

The all new **GT1500.** It's all about performance and satisfaction.

- Intel Pentium IV processor up to 2.8GHz featuring Hyper-Threading technology
- Generous 1.0GB RAM (expandable to 2.0 GB)
- Roomy 80 GB hard drive
- Battery life of up to 5 hours with high capacity lithium-ion battery
- 6.5 lbs, fully configured
- Brilliant 15.1" TFT widescreen display
- 64 MB DDR video memory, higher resolution and more colors for your graphics
- DVD-ROM/CD-RW combo drive
- Integrated wireless LAN

Buy direct at 1-800- laptop1 or visit our site today!
www.GT1500.com

GT1500

Appendix C: STUDY QUESTIONNAIRE

Product Evaluation (Maheswaran, 1994; Malaviya et al., 1996)

Please check the position that best represents how you feel.

_____ is:

Good	O	O	O	O	O	O	O	O	O	Bad
Unfavorable	O	O	O	O	O	O	O	O	O	Favorable
Of high quality	O	O	O	O	O	O	O	O	O	Of low quality
Likable	O	O	O	O	O	O	O	O	O	Dislikable
Not at all useful	O	O	O	O	O	O	O	O	O	Very useful

Confidence in Evaluation (Brinol et al., 2004; Lee et al., 2004)

Below is a series of questions about your evaluation of _____. Please indicate your level of agreement by clicking on the appropriate button.

1. How confident do you feel about this evaluation?

Not at all confident	O	O	O	O	O	O	O	Extremely confident

2. How certain are you of this evaluation?

Not at all certain	O	O	O	O	O	O	O	Extremely certain

3. How valid do you think this evaluation is?

Not at all valid	O	O	O	O	O	O	O	Extremely valid

Emotion (Mehrabian and Russell, 1974)

We would like you to indicate how you felt about the overall product evaluation experience you just had. Please indicate your feelings by checking the appropriate space that is closest to how you felt for each of the pairs of words below.

Pleasure

Happy	O	O	O	O	O	O	O	Unhappy
Pleased	O	O	O	O	O	O	O	Annoyed
Satisfied	O	O	O	O	O	O	O	Unsatisfied
Contented	O	O	O	O	O	O	O	Melancholic
Hopeful	O	O	O	O	O	O	O	Despairing
Relaxed	O	O	O	O	O	O	O	Bored

Arousal

Stimulated	O	O	O	O	O	O	O	Relaxed
Excited	O	O	O	O	O	O	O	Calm
Frenzied	O	O	O	O	O	O	O	Sluggish
Jittery	O	O	O	O	O	O	O	Dull
Wide-awake	O	O	O	O	O	O	O	Sleepy
Aroused	O	O	O	O	O	O	O	Unaroused

Dominance

Controlling	O	O	O	O	O	O	O	Controlled
Influential	O	O	O	O	O	O	O	Influenced
In control	O	O	O	O	O	O	O	Cared-for
Important	O	O	O	O	O	O	O	Awed
Dominant	O	O	O	O	O	O	O	Submissive
Autonomous	O	O	O	O	O	O	O	Guided

Objective Knowledge Measures in Pretest I (Brucks, 1985)

1. Available attributes

   "Please list as many features of _____ as you can."

   "Please list all the things a person might consider when purchasing _____. Please include things that he or she might not personally consider important."

   "Please list features that are common to almost all _____."

2. Attribute covariation

   "Please explain how a $1,999 _____ would typically differ from a $ 1,299 _____."

   "Please list features of _____ that always seem to occur together."

3. Criteria for evaluating attributes

   "Imagine that a friend of yours who knows nothing about _____ wants to buy _____. Please write down everything that your friend should know in order to purchase the most appropriate model."

ObjectiveK nowledge Measures for Digital Cameras

in Pretest II (Chiou, 2003)

Below is a series of statements about digital cameras. Please indicate your agreement with each of the following statements by clicking on the appropriate button.

1. A digital camera can only be connected to PCs; it cannot be connected to an ordinary TV. **X**
2. Traditional negative films can be applied to digital cameras. **X**
3. The aperture should be bigger to create quicker shutter. **O**
4. The visual angle of a long-range lens is bigger than that of a short range lens. **X**
5. One should use slow shutters to blur a moving object. **O**
6. The aperture value of a 35-mm camera can be 1, 3, 5, 7, 9, or 11. **X**
7. The depth of field will be shorter when shooting distance is longer. **O**
8. The amount of entering light of f/8 is a quarter of that of f/4. **O**

ObjectiveK nowledge Measures for Laptop Computers

in Pretests II and III and Main Study

Below is a series of statements about laptop computers. Please indicate your agreement with each of the following statements by clicking on the appropriate button.

1. Dell, Gateway, HP-Compaq, IBM, Sony and Toshiba are the leading Windows laptop brands. Laptops come in various configurations. Which of the following configurations is **not** relevant for laptop computers?

    a. All-in-one
    b. Modular
    c. Slim-and-light
    d. Singular (answer)

2. Which of the following statements is **true**?

    a. "CPU" is the brain of any computer system and the keystone around which system vendors build configurations. (answer)
    b. "Bus" is multimedia Extensions that speeds up and improves multimedia performance.
    c. "Level 2 Cache" is a small, fast memory cache that is built in to the main chip and helps speed access to important and frequently-used data.
    d. "Hard drive" is where the computer temporarily stores data on its way to or from the processor.

3. Docking solution is to do with _____.

    a. turning a laptop into a desktop
    b. integrating communications and peripherials
    c. accessing to external peripherals such as external monitor and keyboard
    d. all of the above (answer)

4. Suppose that your friend is looking for laptop that can handle a high-end applications for image editing and illustration, HTML authoring, multimedia

authoring, or 2-D or 3-D design. Which of the following components is the most critical in your friend's case?

a. CPU
b. Memory (answer)
c. Hard drive
d. Battery

5. Which of the following statements is **not** correct in preserving battery life?

a. Set the processor to run at a faster speed (answer)
b. Dim the LCDscreen
c. Spin down the hard drive when it's not in use
d. Fully discharge and then fully charge the battery every two to three weeks

6. Which of the following types of laptop screen gives the sharpest and brightest image?

a. TFT (answer)
b. HPA
c. STN
d. DSTN

7. "*Everything you could do on the desktop—video and audio, 3D graphics, and XML— you can now do on your laptop. And you can do it at 1.7GHz speeds that provide higher performance, longer battery life, seamless connectivity, and thin and light form factors.*" What does this statement refer to?

a. CPU (answer)
b. Memory
c. Hard drive
d. Battery

8. The first _____ technology emerged in response to the proliferation of external peripheral devices such as scanners, digital cameras, removable drives, mice, keyboards, joysticks and printers.

a. PC-card slot
b. USB (answer)
c. Parallel port
d. Serial port

9. Which of the following is **not** a processor for laptop computers?

    a. Athlon
    b. Celeron
    c. Duron
    d. Sdram (answer)

10. Most of today's laptops use a rechargeable _____ battery that is lighter and longer-lasting than earlier types.

    a. Nickle-Cadmium
    b. Nickle-Metal Hydride
    c. Lithium-Ion (answer)
    d. Smart

11. "*A 5,400 rpm notebook disk delivers significantly faster performance than 4,200 rpm model. Mobil-disk failure rates run much higher than those of desktop disks, so look self-monitoring, analysis, and reporting technology for early warnings of impending problems*" What does this statement refer to?

    a. Hard drive (answer)
    b. Floppy drive
    c. Zip drive
    d. Jazz drive

12. Which of the following statements is **not** true?

    a. "MPEG" is a digital video format created which allows for realistic motion with a smaller file size.
    b. "PCMCIA cards" are peripheral devices that plug into laptop computers.
    c. "Advanced Power Management" is to promote interchangeability among laptop computers where ruggedness, low power, and small size are critical.(answer)
    d. "Optical Drive" is a secondary storage device for computers, such as a CD-R or DVD-RW drive.

13. A laptop can only be connected to PCs; it cannot be connected to an ordinary TV. True or false?

    a. True
    b. False (answer)
    c. Don't know

Subjective Knowledge Measures (Flynn and Goldsmith, 1999)

Below is a series of statements that we would like you to consider. Please indicate how much you agree with each of the following statements by clicking on the appropriate button.

(1 = strongly disagree; 7 = strongly agree)

1. I know pretty much about _____.
2. I do not feel very knowledgeable about _____.
3. Among my circle of friends, I'm one of the experts on _____.
4. Compared to most other people, I know less about _____.
5. When it comes to _____, I really don't know a lot

Product Related Experience

(Cordell, 1997; Graeff, 1997; Park and Lessig, 1981; Park et al., 1994)

1. How much have you searched for information about _____ in the past year?

Hardly any O O O O O O O O O A great deal

2. How much have you used _____ in the past year?

Hardly any O O O O O O O O O A great deal

3. Do you currently own _____?

Yes --- No ---

4. If yes, what brand(s) do you have?

5. How many purchases of _____ did you make during the past five years?

None	Once	Twice	Three times	More than three times
O	O	O	O	O

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Vita

Byung-Kwan Lee was born in Seoul, Korea on March 10, 1964, as the second son of Sewon Lee and Kyungsik Kim. He graduated from Seoul National University in Seoul, Korea with a B.S. (1987) and a M.A. (1989) in Psychology. He taught psychology courses at the Air Force Academy in Korea for three years (1990-1993). For five years until 1998, he worked as a media planner at Korad, Ogilvy & Mather in Korea. He received a M.A. in advertising at the University of Texas at Austin and began pursuit of the doctorate at the same school in 2000. He has published his research in several refereed journals including *Psychology & Marketing* and the *Journal of Computer-Mediated Communication*.

Permanent Address: 3356 Lake Austin Blvd Apt E, Austin TX 78703

This dissertation was typed by the author.